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DOCTORS OF THE MIND

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BY MARIE BEYNON RAY

HOW NEVER TO BE TIRED

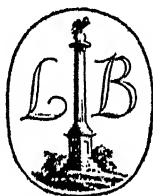
DOCTORS OF THE MIND

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# DOCTORS OF THE MIND

*What Psychiatry Can Do*

BY MARIE BEYNON RAY



*Illustrations by Ruth Ray*

*REVISED EDITION*

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1946

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*TO*  
WILLARD *and* RUTH

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## *Publisher's Note*

*D*OCTORS of the Mind: What Psychiatry Can Do was originally published during the war. In view of the increasing popular interest in psychiatry, due to war neuroses, it is now brought out in a new, revised, and enlarged edition. The book has been praised by outstanding psychiatrists as the best popular presentation of psychiatry ever written. It describes in simple, non-technical language all the various types of cures now available for nervous and mental illnesses, and the excellent chances of recovery due to recent discoveries. It is a practical guide for everyone desiring information on the most modern psychiatric methods.

## *Author's Note*

EVERY event in this book, whether past or present, actually occurred. Every character, living or dead, is authentic. In the case of historical personages and events the personalities, scenes, even the dialogue, are as close to the original as possible. With the living doctors, who appear under their own names, facts are closely adhered to; even their actual words are given whenever practicable, and their thoughts, as here set down, have been checked by them.

In the case of patients, the names, personalities, and sometimes the scenes have, for obvious reasons, been disguised. Always the specific permission of the doctor in charge to include this material has been obtained. No professional secrets have been betrayed and identification of no patient can be made. Any resemblances to actual persons among these patients are therefore purely coincidental.

## *Foreword*

### *ONE WORLD — OR NONE*

ON August 6, 1945, a new Age of Man began and man himself became obsolete. On that day, which ushered in the Atomic Age, mankind was issued an ultimatum. Either he must learn to live in the new world he was about to create, to control the new forces he had unleashed, or perish.

At any time, from this moment on, the bomb *can* be dropped which will annihilate man and perhaps the earth. It is even inconceivable that it will not be dropped — unless, by an unparalleled effort, man remakes himself, learning to subject his primitive nature to extraordinary disciplines. Nothing less than the threat of extinction and the drive to survive could stimulate us to this effort. Perhaps even that will not.

Since August 6 we know beyond a doubt what we vaguely sensed after the First World War — that the situation in which the human race finds itself is perilous in the extreme. Our problem is one of actual survival. This is the result of a curious anomaly. During the past fifty years, due to scientific achievements, we have gained increasing control of our environment but we have made no progress, in thousands of years, in our control of ourselves. In a complicated and advanced civilization, we remain emotionally immature. Today man is an anachronism in the world he has created. The two sides of his nature, intellect and conscience, have not kept pace. Science has outstripped morality. If the human race is to survive in this new Atomic Age, which can make the world over physically, mechanically, economically, politically, it must swiftly grow from

child to man, from savage to civilized human being. It must subdue and sublimate its aggressive instincts — or be destroyed. We would not be the first race to meet this fate. We are merely the latest, not necessarily the last, in a series of races carrying on the evolutionary process.

Racial groups have, in the past, proved capable of radical change and adaptation to their environment; but today it is a question of all peoples, everywhere, adapting to a new world.

Many of the best minds of all ages have devoted themselves to the study of human nature, but because of the impossibility of studying it in a scientific way comparatively little progress was made in understanding and improving it, until fifty years ago.

About that time a new science was conceived in the strangest of places — the insane asylum. This science was delivered on the battlefields of the First World War and has since grown to a precocious manhood. All the greatest developments in this new science have taken place during the past fifty years, in one generation, during the lifetime of men now living.

This is the science of psychiatry. Its province is the study and treatment of the abnormal mind. But the amazing thing is that it throws more light upon the normal mind than all the studies directed to that end have ever done. In insanity, as in wine, the psychiatrist has discovered, is truth — the revelation of a personality, laying bare those mechanisms of the mind which in normal persons are concealed, guarded, and otherwise unget-at-able.

That is why psychiatry offers the one best hope of improving human nature to a point where it is fit and able to survive. That is why it is the one science of which no one dares be ignorant.

The psychiatrist does not live in an ivory tower nor is he exclusively preoccupied with the treatment of sick minds. He is vividly aware of the necessity of informing the layman of the teachings of this new science. But the public (and who can blame it?) does not read medical journals, and the scientist does not speak the public's language. That is why I have en-

deavored in this book to act as an interpreter between them.

Such a book, tracing briefly the history of psychiatry and recounting its achievements of the past few decades, could not have been written without the fullest co-operation of outstanding men in this field. Upon this co-operation I depended for the many interviews which were a chief source of my material, for the opportunities to witness the many new treatments for mental disorders in our most progressive mental hospitals and research institutes, and for the medical explanations and interpretations of these treatments. My debt of gratitude to the doctors who so generously gave of their time and interest is merely recorded (it can never be paid) in the acknowledgments at the end of the book.

Supplementing these living sources of information were the hundreds of books, medical journals, original documents, and abstracts of scientific reports read during the years this book has been in preparation. The publication of this bibliography, representing so exactly what he does not want to read, would only confuse and annoy the lay reader and would be, on my part, pure academic swank.

The writing of this book, attempting to meet the demands of the scientist for technical accuracy and of the layman for a straightforward account of exciting events with plenty of human interest, drama, and color, was, you may imagine, highly acrobatic. But at the same time this method of drawing upon living sources, often the very men who have made the great discoveries in this field, has an extraordinary fascination, for both author and reader. It is as though one set out to write a history of ancient Rome and could interview Caesar, Cleopatra, Antony, and Pompey. We are permitted to sit in on the psychological processes by which these discoveries were made, to hear intimate experiences, to see the human side of science, none of which is allowed to creep into scientific reports.

Two hopes the psychiatrist holds out to us. First, because the mental illnesses which only a short time ago were everywhere written down "incurable" are one by one becoming curable, that very soon the physicians of sick minds will be in the same

position as regards the chances of recovery of their patients as are the physicians of sick bodies. And second, that our race, if it can apply the teachings of psychiatry, may, instead of perishing, become the race of supermen to which we look forward.

The task before us may appear impossible; but that's exactly what mind is — the accomplishment of the impossible.

M. B. R.

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## *Introduction*

### *THE ARMY'S STEPCHILDREN*

**T**HIS is why I fight . . . I fight because of my memories — the memories which, if people like me do not fight, our children will never have. . . . I fight because of the life I hope to live when the fighting is finished. . . . Because if I do not fight, life itself will be death. . . . Because, despite our faults, there is hope in our manner of life, because if we lose there is no hope. . . . I fight because I want my children to be born into a free world, because my forefathers left me a heritage of freedom which it is my duty to pass on, because if we lose it would be a crime to have children. . . . I fight because I am thankful that I'm not on the other side . . . because, but for an accident of nature, the brutalized Nazi could have been me and, but for my fighting, will be my child. . . . I fight in the fervent hope that those who follow me will not have to fight again. . . . I fight to remain free.”<sup>1</sup>

These are the words of one man in our Armed Forces, the spirit of all. This is the kind of man we sent into battle. To such men we owed at least this: to save from death and disease, from crippling and deformity, as many of them as was humanly possible; to bring them home whole, sound, in body and in mind.

This, sparing neither skill nor science, neither money nor our own blood, we endeavored to do. And we succeeded — as no

<sup>1</sup> Excerpts from an essay by Corporal Jack Zurofsky, in a contest on “Why I Fight.”

nation in any war has ever succeeded. *But* — we succeeded with only one of the two classes of casualties.

We saved the bodies of the physically wounded. We did not save the minds of the psychologically wounded. While the physically disabled received the most superb care that the soldiers of any army have ever received, the mentally disabled received little or no care.

This comes to us as a shock. Reports of what has been achieved in treating the victims of combat fatigue have led us to believe that the neuroses of war are swiftly and easily cured. But the cases of combat fatigue were small compared to the number of men who broke under strains other than actual combat.

Approximately 45 per cent of all disability discharges, according to army and navy estimates, were for neuropsychiatric reasons. Civilian estimates indicate that these may eventually amount, in all branches of the service, to approximately one million — official estimates may be as low as half a million. The vast majority of these casualties will have had no treatment of any kind for their disability.

"Those neuropsychiatric cases needing long treatment," a medical colonel, formerly in charge of the neuropsychiatric division of one of our military hospitals, told me, "won't get it. They will be returned to civilian life with a medical discharge."

Of this we certainly were not aware. We naturally assumed that all casualties, the psychologically wounded equally with the physically wounded, would be given proper medical care and be returned home in as good condition as possible. This was not the case.

I have consulted many psychiatrists who are in a position to know the situation thoroughly. Some of them have served in military hospitals; some have had opportunities to observe conditions in many of these hospitals; others got first-hand information from colleagues in the Armed Forces; practically all have had many of these discharged "n.p." (neuropsychiatric) men and women, as patients. All of them testify that these

veterans received little or no treatment while in military hospitals, that, on the contrary, hospital conditions often tended to aggravate their illnesses, even to create neuroses.

Here is what one outstanding psychiatrist, who had seen conditions in a number of military hospitals, told me: —

“The Army actually manufactured neurotics. Without treatment, without work, without constructive activity of any kind, with only stultifying idleness, idleness, idleness, these men became useless, nonproductive members of society, incapable of earning a living. Acute cases, which would have quickly recovered with prompt treatment, became chronic cases, difficult or impossible to cure. The long hospitalization was actually a period of incubation for these illnesses.”

Another psychiatrist who served eighteen months in a military n.p. hospital spoke of the damage of segregation.

“A man suspected of an n.p. disorder might bounce back and forth between his outfit and an overseas hospital half a dozen times before the doctors were convinced that he should be evacuated to the zone of the interior. Meantime word got around by the grapevine that he was a ‘psycho.’ This was the greatest disgrace that could come to him.

“Finally he was shipped home. He might be only a mild early case, perhaps a hypochondriac. Nevertheless he was clapped into an n.p. ward with no adequate psychological preparation. No one had time to explain to him what ‘neuropsychiatric’ means. He couldn’t understand why he, who had only a tremor, palpitations of the heart, shortness of breath, nausea, or some other physical symptom, should be classed with out-and-out ‘crazy’ people. He was confused, frightened, and resentful.

“And he waited — months — to be brought before the Board, agonizing over what disposition would be made of his case. Always in his mind was the question, ‘Am I nuts?’ Some came to believe they were. One young man I knew, who had been two years overseas and many months in an n.p. hospital, greeted his wife on his discharge with, ‘You don’t want me any more. I’m crazy.’ Men who were merely nervous, as many of them were, should never have been segregated. They would have

done much better in wards with the physically disabled and would have been perfectly acceptable there."

A physician who was two years in army hospitals, overseas and in the United States, emphasized these points: —

"A lot of these men were not really sick in the psychiatric sense and many tagged n.p. were nothing of the kind. They were nervous, edgy, but that's a far cry from psychoneurotic. Take the case of a man who has stomach trouble. The doctors decide it's a nervous disorder and he's put in an n.p. ward with men who are obviously 'off the beam.' What does the lad with stomach trouble think? He thinks, 'Why did they put me in here with these loonies? There's nothing wrong with me except I can't keep anything on my stomach.' Three months, six months, maybe a year of that, and he's a full-blown psychoneurotic. Such treatment would make a neurotic out of a normal man."

Not infrequently men who were only mildly ill, whose conduct was normal, were placed in "closed wards," locked up with the frankly insane and homosexuals, with men in strait-jackets, men who had to be forcibly fed, who screamed and cursed. One doctor, speaking of one of our largest n.p. hospitals, said: "The buildings are surrounded with high steel fences topped by barbed wire. It would seem that only dangerous patients would need to be locked up there. Yet men who are perfectly well-behaved, who appear completely normal at all times, are put into locked wards. The effect of this on their minds can be imagined."

Did these n.p. casualties receive no treatment because there are no effectual treatments for these illnesses?

"We were curing these cases back in 1914-1918," a senior physician, a psychiatrist in one of the most progressive mental hospitals in the country, told me. "Today psychiatry is a thousand miles ahead of where it was then. We have valuable treatments for all these disorders, even those which, only a short time ago, were held to be incurable. Considering the years the Army often devotes to treating a man who has been shot with bullets, it doesn't seem unreasonable, does it, to expect it to

devote a few months to a man who is mentally 'shot?' Naturally, some hospitals do better than others, but the overall picture is black. I know of very few psychiatrists in military hospitals who weren't disgusted with their jobs.

Some hospitals did give treatment, but this was the exception. A retired army medical officer stated: —

"The hospital where I worked was one of the best. They were equipped to give the electric convulsive shock — to a limited number of patients. The head of the hospital had to raise hell to get these facilities. The electric convulsive shock, which is so effectual for some psychoses, is almost totally worthless for others. In my hospital they usually gave it according to symptoms, but frequently also according to behavior. If a man raised hob, he was given the shocks to cool him off, make him a more manageable patient. This is not psychiatry. This is punishment. The fact that a certain proportion of the men got well in the process is no justification. Besides, no one knows how many stay well. The Army has no follow-up after discharge."

And then, when, after months of holding them for observation, the Army discharged these men, one would expect at least a correct diagnosis. Even that was not certain.

"We're seeing plenty of cases of hasty, incorrect diagnoses," the head of one mental institution told me. "I have seen any God's quantity of young men, with whom there is really nothing wrong, given serious diagnoses. At the same time men who were seriously ill, and recognized as such, were discharged, a menace to the public."

The Army's own reports are the best evidence as to the types of cases discharged. I have before me a "List of Cases Boarded," twenty-three in all, in one day at one of our large n.p. hospitals. All twenty-three received a Certificate of Disability Discharge, sixteen with a diagnosis of "Psychoneurosis, chronic, severe"; five with a diagnosis of "Psychosis" (insanity); one of a "Psychopathic Personality" (morally irresponsible, the habitual criminal type); one of epilepsy. All but one of these "severely and chronically" sick men were discharged in their "Own Care," and all but this one, the psychopath, were certified as

having acquired their disability in "Line of Duty," or, in a few cases, of having it aggravated in the service. Five cases, the psychotics, were said to be "in remission," that is, improved.

On another day twenty-one men were "boarded," of whom seventeen were diagnosed as "Psychoneurosis, chronic, severe"; three as "Psychosis in remission"; one as a psychopathic personality. All but this last man were discharged in their "Own Care," and listed as having acquired their disability in "Line of Duty."

These lists are typical. It is obvious that these were very sick men.

Although the papers of a man discharged with an n.p. diagnosis must state that he is not dangerous to himself or others, this is no guarantee that he isn't. Many mental illnesses are progressive, and even if a man, at the time of his discharge, is not dangerous to himself or others, he may yet, in the nature of his illness, become so at any time.

Almost daily the newspapers carry stories proving that many of them are decidedly dangerous. One day a Franklin Osterhoudt shoots and kills his wife and is later found walking naked through the streets. His family testifies that he was obviously demented when he was sent home from a military hospital in the custody of two soldiers.

About this same time, Second Lieutenant John B. Kernochan, a Flying Fortress pilot, home on a sixty-day leave after eighteen months in a Nazi prison, jumped from the twentieth floor of the Hotel Commodore in New York and was instantly killed. The police stated that he was a victim of battle fatigue aggravated by imprisonment.

A few days later Alfred Stoner, who had received a medical discharge two weeks before, drove his car, containing his five children, into a water-filled gravel pit in Ohio, drowning them all.

Not long after, Earl Hartley, a medically discharged veteran, beheaded his wife with his Philippine bolo knife.

Every psychiatrist I've interviewed has said, "We see many such cases." One added, "These dangerous or potentially dan-

gerous men should not be turned loose on an unsuspecting public. The Army should either treat them or send them direct to a hospital which will. Under the present system, they, or their families, are given a choice. The man can go home, or to a Veterans' Administration hospital. The men and their families are terrified at the very thought of these hospitals. Almost always the family writes, 'Send our boy home.' "

In the light of the disclosures concerning these Veterans' Administration Facilities (hospitals), their decision is not surprising.

Fortunately these dangerous psychotics represent only a small percentage among the n.p. veterans. The vast majority of these discharged men are not dangerous. They are neurotics, not psychotics. No one will suffer because of their illness except themselves. Does that mean we have no responsibility for them, owe them nothing? . . . "I fight because of the life I hope to live when the fighting is finished."

Dangerous they may not be. Sick they certainly are — and became so in "Line of Duty." The man who lost a leg was not put in a locked ward and forgotten. The man whose face was shot to pieces was practically guaranteed a face as good as ever — maybe better. I've seen the work they're doing in plastic surgery. They worry over the tilt of an eyebrow.

And now, since it is obvious that the Army, specifically the Neuropsychiatric Division of the Surgeon General's Office, would not deliberately and wantonly neglect these men, what is the reason for its failure to give them the same high type of care given the physically wounded?

First of all there is the desperate shortage of psychiatrists.

While there are, in the whole United States, some 186,000 to 190,000 medical men, including surgeons, there are only some 3000 to 4000 psychiatrists. About 55,000 doctors, including all branches of medicine, were in the Armed Forces. About 1800 so-called "trained" psychiatrists were in the Armed Forces. Many of these had only spotty or poor institutional training, reducing this 1800 to a much smaller number of really well-trained men.

Yet this group of 1800 or less had to take care of almost half our casualties. The other half, the physically disabled, had more than thirty times that many doctors to look after them. If the Army had drafted all the psychiatrists in the country, stripping every institution, it wouldn't have begun to have enough.

Take the situation in a single hospital. Mason General Hospital on Long Island, the largest n.p. unit in the country, at the end of the war had some 3000 beds and forty medical officers, of whom only eight or ten were competent psychiatrists, the largest number in any Army hospital. The other thirty were young medical officers of varying degrees of psychiatric training or no training at all, who were learning as they went. Of the eight or ten trained psychiatrists, only four were certified psychiatrists and neurologists. How *could* this handful of men give adequate care to from 2000 to 3000 patients?

If the few psychiatrists in each of these hospitals could have devoted their full time to the care of patients, even then they could have accomplished something. But they couldn't. They were snowed under with paper work, hog-tied with red tape. Almost all their time was taken up with preparing cases for the Board.

The Army made an effort to overcome this shortage by training its own psychiatrists. In both civilian and military hospitals, M.D.'s were given brief orientation courses so that they could fill in as psychiatric aids and do full-time psychiatric work.

"They started too late," an eminent psychiatrist told me. "The Army should have anticipated this situation and prepared for it. We told them when war seemed inevitable to get ready. The Air Corps at Randolph Field trained its own medical officers, giving them courses in psychiatry. Other branches of the service could have done the same, and done it in time."

A second reason for the Army's failure was this: —

There is, the Army maintains, a fundamental difference between a physical wound and a psychological wound, between a case of malaria and a case of dementia praecox. A man has no inherent tendency to get shot; he often has an inherent tend-

ency to nervous or mental breakdown. He has no predisposition to jungle fever; he has to a manic-depressive psychosis.

So although these men may have broken *in* the Army, they were not broken *by* the Army. They would have blown a fuse sooner or later in civilian life. Instead of their illness being associated with an incident of peace, it happened to be connected with an incident of war. The Army didn't *cause* their disability, although it may have precipitated or aggravated it.

In proof of this it points out that many of these men had a history of nervous instability before entering the service. The brief psychiatric examination at the Induction Centers, while it screened out almost 2,000,000 n.p. cases, didn't get them all.

Further proof of their inherent instability is the fact that the great majority of them broke in training. Only about 15 per cent or 20 per cent broke in combat, the others in training or overseas noncombat duty. The Army, therefore, has no such responsibility toward those men as toward those who had no predisposition to bullets — and yet got shot.

Most psychiatrists will agree that the majority of these men had a predisposition to nervous illness. Psychiatrists believe in predisposition. For that very reason, they point out, and because the Army was not primarily responsible for their breakdown, it should have discharged them quickly, not held them for months while they deteriorated.

"The Army could have reduced its problem to manageable size by discharging its mild and acute cases promptly," one authority said. "From one third to one half of these men could have been swiftly released — and to their own benefit, since these cases respond much better to out-patient treatment than to hospitalization. By thus cutting down its cases to rock bottom, the Army would have had enough psychiatrists to treat those who were seriously sick."

Whatever the reasons for the Army's failure, the problem of the n.p. veteran is now up to the community. And the community is totally unprepared for it.

"The biggest medical problem facing our Army today, and

civilians for years to come," said Dr. Thomas Rennie, Associate Professor of Psychiatry, Cornell Medical College, "is the psychiatric casualties of World War II."

As to the size of the problem, here are a few figures: —

#### *The Number of Patients*

1. Well over half a million veterans from all branches of the service.
2. Approximately 1,700,000 men rejected in the draft for n.p. disabilities.
3. Approximately 80 per cent of the n.p. veterans, according to a survey made of New York City discharges, in need of outpatient treatment; only 5 per cent getting it.

#### *The Facilities*

1. The Veterans' Administration Facilities have not the accommodations for these veterans. General Hines estimated that eventually 300,000 beds would be needed. There are, at present, 35,000.
2. The state mental hospitals of the country are already 110,000 beds short, even without the veterans.
3. A survey made by the National Committee for Mental Hygiene shows that the individual states have no conception of the problem and no plans for coping with it. Twenty-five states haven't a single community clinic for outpatient treatment. There are vast areas in other states where no psychiatric help whatever is available.
4. There are fewer than 3000 qualified psychiatrists in the country; 10,000 at least are needed.

#### *The Cost*

1. Every hospitalized psychiatric casualty of World War I has cost the taxpayers to date \$30,000. In addition, \$700,000 per month is being paid out in pensions to the n.p. veterans of that war. Yet their number is small compared to the psychiatric casualties of this war. The cost to the taxpayer for the care and compensation of the n.p. veterans of World War II will run into billions — unless we provide immediate treatment.

Thus stated the problem is seen to be this: Can the community do what the Army failed to do? The answer must be Yes.

The logical place for these veterans to go for treatment, the place provided for them, is the Veterans' Administration Facilities. The V.A.F. is not prepared to take them. Not only is there a shortage of beds for the hospitalized cases, but there are few clinics. What most of these men need is the outpatient treatment provided by clinics. The few clinics of the V.A.F. are inaccessible to a large per cent of the men. In addition many men are ineligible for V.A.F. benefits. Moreover, the intolerable conditions, including physical abuse, which were discovered in these hospitals during the war have terrified the men. For years they have been running at a dead level of inefficiency, apathy, neglect. As a result of these disclosures, Congressman Rankin, Chairman of the House Veterans' Committee, started a Congressional investigation and President Truman appointed General Omar Bradley, a veteran of this war, to replace General Hines, a veteran of the previous war, as Veterans' Administrator.

No doubt General Bradley will be able to reorganize these ninety-seven hospitals, thirty of which are for n.p. cases, on a sounder basis. But building, the installation of facilities for modern psychiatric treatments, the enlarging of hospital staffs, the establishment of treatment centers — all that takes time. In one interview, General Bradley himself said, "I am worried about the next eight or nine months."

The building of hospitals takes time. The training of psychiatrists takes much more time. The doctors serving in the V.A.F., many on loan from the Army, are resigning wholesale. Neither the pay nor the prestige, the institutional life nor the opportunities for medical research, are such as to attract good men. General Bradley has frankly stated, "We know we have some poor doctors. The question is: Shall we keep them or let them go with no replacements available?"

Given time, General Bradley will no doubt overcome most of these obstacles. Meantime where does the veteran go for treatment?

The state mental hospitals?

Even without the veterans, there is that shortage of 110,000 beds. Those awaiting admission are locked in jails and alms-

houses and when finally they do get in, they merely move from one prison to another. For most of these institutions, the name "hospital" is a euphuism. The old "insane asylum" comes nearer the truth. The word "psychiatry" has never been whispered in their corridors. They give no treatments, there are guards instead of nurses, the patients are still "inmates." No, they are not the solution.

What then?

The men with the courage to tear down are the men with the courage to build up. Those psychiatrists who have been sharpest in their criticism of the Army's performance are the ones who now come forward with plans for meeting the situation.

First, they ask that the services of the general hospitals throughout the country be expanded to include psychiatric wards. This, they point out, is not merely an emergency measure, but right in line with recent trends in medicine which more and more insists that a man is not two things, a body and a mind, but one thing, a body-mind, which falls sick as a unit and must be doctored as a unit. Every illness, whether tuberculosis or schizophrenia, involves the whole organism and must be treated both psychologically and physiologically. Therefore including both classes of illnesses, which to the public still seem to be so entirely different, in one institution, is in accord with the most modern medical thought and would be beneficial to both types of patients. Where it has been tried, here and in England, it has worked. Many state legislatures are planning to enable their general hospitals to acquire the facilities for treating certain types of psychiatric cases.

One of the best plans along these lines is that offered by Dr. James Cunningham of Hartford, Connecticut, now in pamphlet form. It should be consulted by any group contemplating reorganization of its community hospitals to take care of returning n.p. men. The benefit to him of being able to go to a home-town general hospital where every type of treatment is available, perhaps of living at home and going to work while taking treatment instead of being shipped off to some distant

"insane asylum," is great and should overcome any antipathy to having at least the milder psychiatric cases under the same roof with the physically ill.

Next, they propose several plans to take care of the shortage of psychiatrists. In order to close as quickly as possible the gap between the 3000 psychiatrists now available and the 10,000 needed, they suggest that general practitioners throughout the country take brief courses in psychiatry at the post-graduate level. After all, they point out, it is the general practitioner who, in all small communities and many large ones, will have to meet this problem. Even a brief orientation in this branch of medicine would help him to meet it intelligently. Waiving civil service examinations for doctors in the V.A.F. and permitting veterans to go to their own doctors at government expense, are other solutions.

They also suggest that all medical students be given courses in this specialty, that those finishing their schooling be made aware of the opportunities in this field and encouraged to specialize in psychiatry, and that fellowships in psychiatry be made available for internists and general medical men. Thus many men trained in psychiatry would soon be practising.

They finally suggest the opening of clinics in every community of any size in the country. Often a single psychiatrist, backed by a team of co-workers, can provide all the service required. A few progressive communities have already established clinics to which the veteran, fed to the teeth with military hospitals, is willing to go. He is *not* willing to go to the V.A.F., to a state mental institution, to any kind or sort of hospital. A hospital? He hopes to God he'll never see the inside of one again! A psychiatrist? What did they ever do for him?

So once home he hangs around the house all day, ashamed to call up old friends, fabricating some physical ailment to explain his discharge, wandering out to a movie alone in the evening. He drifts for six months, a year, getting no better.

"I've seen a lot of these boys," the psychiatrist in charge of male patients in one of the outstanding and largest psychiatric hospitals in the East told me. "They never come in under their

own power. They're always brought in by a relative. There he sits, Jim or Tom or Bill, and I know what he's thinking. He's fed up with hospitals. He's afraid of psychiatrists, scared to death by his diagnosis, and terrified even of a nice place like this. Then he catches sight of a locked door. That finishes it. No, thank you, he's not having any treatment. Or if he can be persuaded to start treatment, he quits before it's finished. A lot of them, who could have been saved, are going to wind up in mental institutions."

But a clinic in his own home town to which he can go while living at home and perhaps holding a job, that's different. Once they understand, these men who are allergic to psychiatry, that usually nothing more alarming than brief or group psychotherapy, in the form of personal interviews, is needed to straighten them out, they go willingly.

Any community desiring to start such a clinic could do no better than to follow the pattern of those already successfully operating—for example, the New York Hospital Rehabilitation Clinic organized by Dr. Thomas Rennie, Director of the Division of Rehabilitation of the National Committee for Mental Hygiene; the Bridgeport Society for Mental Hygiene Clinic, under the direction of Dr. George K. Pratt of Yale; the Mount Zion Hospital Psychiatric Clinic, Dr. J. Kasanin, Director; the Veterans' Readjustment Service in St. Louis, Dr. Edwin F. Gildea, Director. A booklet on "How to Organize a Rehabilitation Clinic" by Dr. Rennie is available on request from the National Committee for Mental Hygiene.

Finally state and Federal legislation should be enacted, such as Bill H. R. 2550, known as the "National Neuropsychiatric Institute Act," which would co-ordinate psychiatric services across the country, making them part of the United States Public Health Service, with an appropriation of eleven million dollars; and Bill H. R. 4717, already enacted.

There *are* solutions for this "biggest medical problem facing civilians today." They all depend for their success upon the awareness of communities that this problem exists, that it is up to them to meet it, and upon the energy with which it is

tackled. The penalty to *us* for failing to solve it will be additional billions in taxes. The penalty to *them*, the men who fought this war, will be their wrecked and crippled lives. If they are not to sink into the pitiful condition of those 35,000 "shell-shocked" veterans of the last war who today linger out a twilight existence in mental institutions, we must bring them this help at once.

A million young Americans are not expendable.

So far we have looked only upon the gloomier side of this picture. There is a brighter side and that, too, we should see.

Not every man with an n.p. discharge is going to be a problem. Many who became ill while in the Armed Forces will recover spontaneously on separation from them. It was not so much that they were maladjusted human beings as that they were maladjusted to military service. Instead of being labeled n.p. they should perhaps have merely been designated as "unfit for military duty." (The Army's idea, of course, is that any male who isn't a first-class fighting man isn't entirely normal.) They got along well enough in civilian life before and will again. Once released, they are self-healing. For them a speedy and thorough assimilation into civilian life is often all that's necessary. They often make the most valuable employees — and employers. A touch of neurosis is frequently no handicap.

And then there is that great backlog of men, the vast majority of those in our fighting forces, who are coming back as stable, as well-balanced, as when they went away. Many of them will be better men — more mature, experienced, self-assured, with skills and abilities they would never have acquired at home.

The thing our veterans most resent is the idea that most of the men who've seen overseas duty will come back slightly "off the beam." As one veteran put it, "We don't like our wives being scared and coached in how to receive us — not, please God, with the look of a trapped and frightened doe waiting for the blow to fall."

Nothing could be more erroneous than the idea that we sent an army and navy of neurotics overseas to fight our battles. Few fighting forces were ever made up of more stable men.

On September 15, 1942, the aircraft carrier *Wasp*, escorting the first marine reinforcements to Guadalcanal, was hit by torpedoes and sunk, amid explosions of gasoline, ammunition, and bombs, amid a hailstorm of bullets and shrapnel, amid burning oil on the water. There were 1800 men on board with 180 officers. Commander B. W. Hogan, U.S.N., a psychiatrist on the carrier, describing the event to a meeting of psychiatrists, ended his talk thus: —

“For a number of years I have heard psychiatrists, educators, clergy, and others speak of the deterioration of the American youth — born in the drunken, lawless prohibition era of the ’twenties, raised in the depression days of the ’thirties. I tell you that we here should pay tribute to those eighteen–nineteen–twenty-year-old men who are winning the war and remaining stable.

“The officers and men on the *Wasp* were magnificent. There was never any panic. They courageously fought to save the ship. They risked their lives to help their shipmates, especially the wounded. And in all this only two minor neuropsychiatric cases developed. They all desire to be assigned to carrier duty and get back into the fight.”

When we think of perhaps one million n.p. veterans, we should not forget the many millions of young men who, like the crew of the *Wasp*, took the worst the enemy could give and asked for more.

The Army’s stepchildren, thrust into our midst, have done more than call our attention to their own problem. They have lighted up the whole field of psychiatry, and we are suddenly aware that they are only a small part of the problem. A million n.p. veterans? There are several million n.p. civilians! Who need treatment. Whom we have always neglected. Whom we have “put away” and forgotten. The eternal stepchildren of society.

This doesn’t necessarily mean that the human race is de-

teriorating, that there is a terrific upsurge in these illnesses. It merely means that today we "spot" these cases. Whereas formerly we thought of neurotics as "queer characters," difficult or antisocial, whose queernesses were a matter of personality which they could certainly reform if they put their minds to it, today we recognize them for what they are — sick people in need of treatment. They, too, are our responsibility.

That we are aware of this responsibility is shown by the tremendous recent interest in psychiatry. Overnight it has become a "popular science." Suddenly everyone wants to know something about it — the many million men who, at the induction centers, for the first time met a psychiatrist face to face and wondered what he thought of them; the friends and relatives of the almost two million who were rejected for psychiatric reasons and of those other millions in the civilian population who suffer from some aberration; those who suspect in themselves some secret mental twist — all these want to know where psychiatry stands today and what it is prepared to do.

Some knowledge of the birth pangs, the growing pains of this great science of healing, which in our own lifetime has grown from adolescence to assured manhood, is necessary if we are to understand how and why it heals. So suppose we go back to the days when psychiatry was being conceived — to a great man named Mesmer, and another named Broca, and another, Freud.



DOCTORS OF THE MIND



I

## *Degenerate Adam or Perfected Ape?*

YOU are in the laboratory of Dr. James Papez, that famous laboratory of Cornell University which houses the Wilder Brain Collection.

Here, for twenty-five years and more, Dr. Papez has measured, weighed, compared these dead brains, trying to discover — what? Some sort of explanation of the unknown in terms of the known, some sort of bridge between this tangible thing, the brain, and that intangible thing, the mind.

“What in this,” he asks, laying his calipers over a human brain, “accounts for — for the campaigns of a Napoleon, for the theories of a Copernicus, for a Beethoven sonata, for the propositions of Euclid, for a poem by Keats?”

A thousand brains are here — brains of savants and brains of idiots, brains of children and brains of men, brains of fish and brains of alligators, brains of bats, cats, monkeys, apes. Brains of the human embryo in every stage of development. Brains in bottles and in jars, brains in chiffon slices, in sections and cross sections, mounted on slides, suspended in balsam.

Dr. Papez has spent his life questioning dead brains, and, as we shall see, dead brains sometimes speak.

Now look over Dr. Papez’ shoulder as he stoops above a pair of tiny brains.

“This,” he points out, “is the brain of a fish. And this, the five-weeks-old brain of a human embryo.”

You look. And it is uncanny and you can’t believe it and you don’t like it. You don’t like it at all. For these two brains

are so exactly alike that if Dr. Papez were to practise a little legerdemain . . . !

He shifts them about and, as one who asks, "Where is the pea?" glances up. But now you can't tell which is the fish brain and which the embryo human brain. You shake your head.

He turns to the cabinet behind him and sets before you another pair of brains, very much larger, and again, to your eyes, looking exactly alike.

Dr. Papez explains: "Both brains, as you see, have two great hemispheres united by a broad commissure. Here is the cerebellum, here the cerebral cortex, here the parietal cortex. Note the similarity of all the convolutions. Here lies the hypothalamus, the optic tectum, the dorsal thalamus. All these things are in both brains, looking, wouldn't you say, exactly alike?"

"Here," you say to yourself, "without a doubt, is the good old vertebrate brain, highly developed. Both are certainly human. Papez won't fool me this time."

"Human," you answer decisively as he questions you with a raised eyebrow. "Human but young. Look enough alike to be twins."

So far Papez, with that big-domed head of his, with that fuzz of hair he's all but rubbed off at the front and that tuft that he twists at the back, has never gone beyond a quizzical smile, but now you learn that even a dusty scientist can roar with mirth. Papez leans against a cabinet and hundred-year-old brains shake with his laughter.

"Well," he says at last, still chuckling — a scientist doesn't get a laugh like this every day — "you're 50 per cent right. One is a human brain and, as you say, not adult. In fact it's an embryo brain only seven and one-half months old. And its twin, as you so amusingly call it, is an ape's brain. Would you like to say which is which?"

But you wouldn't like to say which is which at all. You want to get out of there as fast as possible — before the whole place turns into a Dr. Caligari's Cabinet with you sitting up on your hind legs begging for a banana.

"A very pardonable mistake," Dr. Papez murmurs, showing you to the door. "I used to make it myself."

But out on the street you can't help thinking of those two brains so exactly similar — brain of ape and brain of man. What was Papez trying to tell you, so that, seeing it with your own eyes, you would believe it?

"Evolution," he had murmured. "All life, even the brain of man, is an evolution." And he had laid before you brain of fish, brain of ape, and brain of man to show you what he meant.

And suddenly you say out loud, "If this is true then it is the most wonderful story in the world!"

If this is true . . . !

On November 24, 1859, a book was published the entire edition of which was exhausted on the first day. A *Gone with the Wind* or an *Anthony Adverse*? The latest thriller by Charles Dickens? Not at all. A book that is tough going even for a scientist, a book that became a best seller because of its enormous unpopularity — Darwin's *Origin of Species*. No book ever launched a longer, bitterer war.

The Big Bertha of that war was fired in 1860, on the day when the great naturalist, Huxley (who delighted to call himself "Darwin's bulldog"), met the great theologian, Bishop Wilberforce of Oxford, in their historic debate (which was more like a duel) on this new theory of evolution advanced by Darwin. The Bishop was left for dead on the field of combat, but, being British, he didn't know it.

Since that day, the *fact* of evolution has never been seriously disputed — not by any scientist at least. But even today battles concerning the *way* of evolution are still being fought. Religion and theology have withdrawn from the first line of defense to the comparatively safe proposition that, even though evolution does seem effectually to dispose of Adam and Eve, it does not necessarily eliminate God.

Darwin was not the first scientist to conceive the theory of evolution. Even had there been no Aristotle, no Lamarck, he would not have been the first. Wallace crossed the tape with

him. However, it isn't who says a thing first that matters — but who says it best, and no other exposition of evolution can stand comparison with Darwin's. He made evolution not only believable but impossible not to believe. He even made it attractive.

Before Darwin, man was a lone, isolated creature standing stark against an unrelated background, having no biological past or future. Today we live against an evolutionary background, our destiny extending as far back as the first unicellular life and infinitely further forward than the boldest mind can grasp.

But important as evolution is biologically, it is even more significant psychologically. Darwin made it indisputable that man was a higher animal, not a fallen angel or an imitation god. As soon as this vista, leading back to the ameba, flashed upon the psychologists, they at once recognized why they had made so little progress in understanding the nature of man. Today psychology and psychiatry recognize that the human mind, without this evolutionary background, is quite unintelligible.

There is no quest in which man has been more continuously and passionately interested than the search for the origin and nature of that immaterial part of himself which he calls variously his mind, spirit, soul. Long before the dawn of history, the earliest creatures to take on humanity felt within themselves the presence of something which marked them off from all other animals, something unaccountable and probably immortal. Several hundred thousand years ago, Neanderthal Man, building graves for his dead, bore witness to his belief in the existence of something other than body and in its continuance after death. The greatest minds of every age have ceaselessly searched for the origin of this higher part of man, for the *what*, *why*, *how*, *whence*, and *whither* of the spirit which was felt to be the essential and important part of him. For the most part they have regarded man, not as one with the rest of creation, but as a separate and divine creation.

If the immaterial part of us is a gift from a God, unrelated

to anything else on earth — that is one thing and we are one kind of creature.

If it has been slowly evolved from lower forms of life, having its roots deep in a biological past — that is another thing, and we are another kind of creature.

Through all the speculations of man concerning his own nature has run the conviction that man is two things, a Body and a Mind (or Soul), and that these two things, though related and connected, are by no means inseparable. On the contrary, they have been held to be highly detachable; the Soul could, and unquestionably did, detach itself from the Body at death and continue an independent existence.

Holding this view, even the profoundest minds were prevented from searching the body minutely for the origin of mind. Other things also prevented them. Science had not advanced to the point where it was possible to investigate the living body in the search for mind. From the dead body all thought had fled — why look for it there? Moreover, for purposes of resurrection, the body must be kept intact. Autopsies were criminal, illegal, and blasphemous.

Naturally it was conceded that the soul had some sort of connection with the body. It dwelt in it, temporarily, and animated it. It must therefore have some definite place of residence in the body, some "seat." And this seat was diligently, if unscientifically, sought.

Today every schoolboy knows that the brain is the special organ of mind with nerves running to and from all parts of the body over which, by some still-not-understood propulsion, it sends out and receives messages.

Elementary, my dear Watson? Exactly so. But would you believe that your own quite immediate forbears, enlightened and highly educated though they undoubtedly were, had no such idea of the brain? And in ancient times — well, I'd hate to tax your credulity with the speculations of antiquity concerning the mind. Every organ except the right one was suspected of being the "seat" of mind. At first the liver had it, then the kidneys, the bowels, the heart, and so on.

Almost never was that most unobtrusive, silent, inaccessible organ secluded in the skull so much as dreamt of. Even the great Aristotle, the foremost physiologist, as well as the foremost almost-everything-else of his time, believed that the mind was closely connected with the blood, since loss of blood meant loss of consciousness and fevered blood meant delirium. The heart therefore, he argued, being the source of blood, must be the seat of mind.

You can't shrug off Aristotle. He was a man whose intelligence has still to be beaten, many believe even equaled, and who, almost twenty-three hundred years before Darwin, originated the theory of evolution and worked out with considerable detail and clarity the descent of man from the lower animals.

True, a small-town boy by the name of Alcmaeon had advanced the opinion that the mysterious collection of matter in the skull, which seemed to have no particular function, might possibly be the seat of reason. But since he was only a colonial, the bigwigs in Athens paid him small heed, and if his absurd theories were occasionally laughingly referred to, it was as "somebody's views."

A little later, Hippocrates, who must still be regarded as one of the greatest physicians of all time, backed up the views of this "somebody," declaring unequivocally that the brain was the source of intelligence; and later on Galen took the same position, weakening it a bit, however, by suggesting that this simple little arrangement of matter in the top of the head was also a sort of air-conditioning system for the body.

But these were exceptional men and their views were not generally accepted. They were forgotten, and two thousand years later we had to work them out for ourselves all over again.

Of course, down through the ages, there have been a few bold spirits who have held out for the indissoluble unity of body and mind. But most people went right on thinking that their souls were completely detachable from their bodies, were, in fact, two altogether different things. Most people, right down to the present moment, still hold that view.

Then came Darwin, and physiology really got going — also

biochemistry, pathology, bacteriology, surgery, and other sciences which study man as animal. It was soon recognized that these physical sciences were revealing more about the mind and nature of man than all the speculations of the thousands of years devoted to studying him as a temporarily embodied spirit with Heaven as his home.

That the body of man is the product of a long evolutionary process has, ever since Darwin's day, been an accepted fact and a matter of common knowledge. But that the mind of man is equally the product of evolution is not so familiar a story, for it is only in our own day that this has been fully developed — and it is much, much harder to accept. Prove it as we will, let reason acknowledge it as it must, something still rises up in us which says, "There is more to man than that. Man is more than his chemistry. Calcium is not a man, nor is oxygen, or carbon, or electricity. Yes, he is all these and many other chemicals, but he goes beyond his chemicals. When you have reduced him to his elements, you still haven't explained him. There is still something lacking, an unknown quantity, an  $x$  that exists in man alone. If you possessed all possible knowledge of him on these physical levels, you still wouldn't begin to know or understand this extraordinary creature. You still haven't explained him *spiritually*. That a man should lay down his life for an idea — that goes beyond the chemistry of man. It is something evolution can never explain. That a man will die for a concept — this is unique in him, unparalleled in the universe."

This perhaps we can never explain. But following the clue presented by the brain, we can at least make a beginning.

The story of the evolution of the brain of man is one of the questions Dr. Papez has put to his thousand brains — and they have answered it.

This is the tale those dead brains tell.

In the depths of the ocean life began. In the beginning were unicellular organisms, reproducing their kind by the simple if unexciting method of division. Collections of cells composed

primitive aquatic forms of life till at last, in millions of years, they reached a glorious climax in the sponge.

A sponge, doubtless, has never claimed your fascinated attention. Yet it was, in its day, a greater phenomenon than Caesar in his. It achieved such a unique arrangement of cells that scientists cannot look upon it without a kind of awe. Here clearly, for the first time, they can see through their microscopes the organization of forces which will eventually produce brain. That simple creature, 'twixt plant and animal, took the first step toward matter-becoming-mind. . . . How?

The sponge set up the first class distinction in the world, a class distinction between the cells of its own body. Before this all the cells composing the simple creatures of the sea had been alike and equal, all doing the same work. But now came a division of labor; the separate cells lost their independence and were incorporated in a single individual. This the sponge accomplished by developing certain cells at its pores and outlets which had nothing in the world to do but contract and relax — the *muscle* cells.

Muscle — that's a long way from brain, you think. But wait. Time was no object when the world was young. We had millions of years to go.

Adopting this epochal device of the sponge, other water creatures (fancy a world in which the sponge was the Last Word!) equipped themselves with muscles in many parts of their bodies, gradually working up to thirteen sets of muscles, each for a different purpose.

Now arose a difficulty — and a difficulty with nature, as with genius, is always an opportunity. The difficulty was this: A creature with many sets of muscles needs, obviously, some means of controlling their activities. If they are to act together, they must have a supervisor.

Comes the sea anemone.

Sir, madame, if you think the sea anemone beneath your notice, consider this: that it achieved — I do not hesitate to say it — the most stupendous feat in the history of life on this earth.

It developed the first nerve cell ever to appear on this — or, as far as we know, any other — planet.

Just that. No more. And poems and symphonies have not been written to the sea anemone!

The first nerve cell! The actual stuff of brain! The most valuable substance on earth, beside which radium at \$10,000,000 a pound is mere dross!

These nerve cells were the first, and are still the most perfect, means of communication known to man. How do they communicate? When a neurologist is all through explaining that, he might just as well have saved his breath, for all he has said is, "Some sort of minute nervous or electrical impulses — maybe."

We still don't know how that sudden warning, "Danger ahead," and that sharp command, "Retreat in good order," get over the wires of the sea anemone's ridiculously simple nervous system. Here, for the first time on earth, were assembled the primary elements needed for the origin of the brain. . . .

Now the next step.

You are in swimming, a Something clamps itself on your leg, stings like billy-o. Damn that jellyfish!

Really, sir! To a jellyfish! Think a moment!

We have our nerve cells, a few scattered, slender strands of nerve fibers. Good! But this is a very limited system of communication. Something more is needed. What is needed is a merger, uniting all these separate nerve fibers into one system with a central headquarters to act as a clearinghouse for messages from all parts of the body.

It took a few million years — and a jellyfish — to produce it.

A jellyfish has two layers and where they join they form a rim completely surrounding the body. A rim is an ideal place in which to tuck away a ring of those sensitive nerve cells. A ring. That means uninterrupted communication! In a word, a central nervous system.

Think twice before you swear at a jellyfish again — and then run for the olive oil instead!

Now! Among all the shapeless and any-old-shape creatures

which swam through water and crawled through slime, there came at last a long, thin thing, humping and squirming along. And this, somehow, seemed to be the right thing.

It was, so please the Court, a worm, a flat worm. And it took another million years or so to work up to this Big Moment.

What was monumental about this worm was — that he had a head. The first head on earth! It would seem fitting that we, who have such a conceit of our heads, should pause a moment and bare them in homage to the first head ever to appear.

Once accomplished, it seemed, like all works of genius, the obvious thing. A long, thin creature can't go all forward at once, like a jellyfish. One end must go first. Call that the head end.

Now it's obvious also that, in a long, thin creature where the muscles must be crowded together in a narrow space, there isn't much room for nerve fibers. So what is the sensible thing to do? The sensible thing is to concentrate the nerve fibers at one end, preferably the end that goes first — the head end.

And there you have your head!

If you haven't actually a brain, at least you have a place to put it. Gradually you will see more and more of that nerve stuff collecting in the head end of animals, till at last it can no longer be denied that this is a brain.

From the sponge we got our first class distinction among cells.

From the sea anemone we got our nerve cells.

From the jellyfish we got our central nervous system.

From the worm we got our head. . . . And no statues have been erected to the worm!

From now on nothing can stop us. Upward we struggled through many forms of marine life, until at last the day came when something flopped or crawled out of the sea or was stranded by the receding waters. Trapped on land, this water animal yet had the urge to survive. Could it?

Several months ago a gentleman traveled from Nairobi, in Africa, to Chicago, a distance of ten thousand miles, with an odd, bulky package of which he took the most extraordinary care. Opened upon its arrival in Chicago, it was found to con-

tain an ordinary tin can, which, opened in turn, disclosed a large cake of dried mud.

But now the mud cake is cracked open and a strange creature, looking entirely dead, lies at the bottom of the can. A curious thing: this creature is completely covered with a shiny envelope closely resembling cellophane — which it is not, but a little device this animal thought up for itself long before the du Ponts went into the business. Beneath this waterproof covering, its skin (though it has been encased in this mud cake for many months) is as moist as though it had just been recovered from the sea.

Now the scientist who has gone so far and undertaken such desperate adventures to procure this creature drops it into a tub of water, and hanged if the thing doesn't start swimming about and barking like a dog. . . . An African lungfish, that's what it is; and it can live, not a few months, but several years — four anyway — in a cake of mud as hard and dry as a board.

That's the dodge they adopted, those fish trapped on land many million years ago. Exactly as did this late survivor of their species, so rare that Dr. Homer Smith had to prowl around for months in the darkest parts of Africa to find him, they sank deep into the mud and lay at the bottom of a vertical passage through which, as long as the mud remained damp enough, they occasionally rose for a breath of fresh air, one lung saying to the other, "That's the stuff I was telling you about." And when the mud dried, they lay dormant, years if need be, till the waters returned.

During the Devonian period, a small matter of some three or four hundred million years ago, the lungfish thought that one up. You can see that creatures of such resourcefulness and staying powers aren't going to be easily licked.

Lungs for gills, legs for fins, more head and less tail — that's how they managed it, those first amphibians.

Till at last there were frogs.

What a leap toward the ultimate goal, the brain of man, when the frog appeared! Well, you may say, a frog is nothing to shout about. But consider the fact that over a billion years have

now gone by since the building of brain began. That in his day the frog was a lord of creation, with the best brain developed up to that time. That he has a skull in which to house his share of the most valuable substance on earth; a spine to support this skull and to protect the nerve fibers running from the brain to all parts of the body and back again; and *five senses*.

He has solved practically all the problems of brain making.

And you are not proud of your descent from this splendid fellow?

At this point most of us would be willing to admit that now we have something ready to be called a brain. Certainly we wouldn't be willing to take oath that it was *not* a brain.

Well then, if the frog was such a magnificent achievement, what is wrong with him?

There is this wrong with him: that, although he possesses many of the same organs as man and many of the same brain mechanisms, although he can do a lot of things no animal before him could do, yet his actions are decidedly limited. Instead of being varied and deliberate, they are limited and instantaneous reactions — reflexes. To the same situation a frog almost always makes the same response.

The trouble with the frog is that he's not equipped to change his mind! The trouble with the frog is that he has a one-track mind.

What was needed next, therefore, was a brain with delayed action. Delay means that two ideas can sprout where only one grew before — and then we have a choice of actions.

So a brain that could give us *voluntary* action should be the next step.

Our hind thought is extraordinary. We see now so clearly how it was done. But a special commission composed of Darwin, Newton, Copernicus, Aristotle, and Einstein couldn't have figured it out *before* it happened. It occurred in the most unpredictable manner.

In the brief space of another few million years, land animals developed such a variety of ways of getting about that the

earth, which once had not so much as a snail crawling upon it, teemed with thousands of new species. From amphibians to reptiles they advanced, from reptiles to birds — and also, by another branch, from reptiles to mammals.

Mammals! The species which is to have the honor of producing *Us*.

And right here a curious thing happened. We can only consider it a colossal mistake. Anyone who is tempted to think that Nature works with a plan has only to contemplate the opportunity she passed up here.

For suppose that if, instead of developing the mammals till they reached a magnificent climax in Man, she had worked along the lines of the winged creatures of the air. Suppose that, without sacrificing the legs needed for locomotion or the arms needed to handle tools, she had added wings, and that these creatures, taking to the three-dimensional medium of the air, had followed their destiny to its logical conclusion — what would we have had? Angels, that is what we would have had. Angels with a brain on fuller lines than our own, earthbound as we are.

Perhaps it is not even now too late. Nature may yet, in disgust, scrapping this failure, Man, evolve a new and transcendent species — though of course it is also in the cards that Man, in his domination of the earth, might conquer and subjugate this superior race.

But to return to the four-legged mammals which Nature, taking a wrong turn perhaps, continued to experiment with.

These many species, scampering and clambering over the earth, encountered new and dangerous situations — situations which couldn't always be dealt with by a simple reflex action. So they had to develop better brains. More and more nervous tissue was added to that in the skull till finally, pushing beyond the limits of the old reflex brain, it gathered in front of and above it in the cerebrum — and we have a brain which can choose.

All right. The next thing we know, certain animals, who lived in trees and so didn't really need *four* legs, began to use

two of them to grasp with and hang by, to hold and turn and examine things with. In a word, they began to use the foot as a hand.

And so we arrive at the Great Apes.

Now if we pause here and ask, "Where is the proof of all this?" what is the answer to that? May not the whole story of evolution be merely a very logical and plausible theory for which there is not sufficient scientific proof?

You may go so far as to admit, "Well, yes, physically we're so similar to the great apes that it isn't really difficult to accept our bodily kinship with them. But the best brain the apes can produce is so far below man's that the gap here can't possibly be bridged."

You may even say, "It isn't even the intellect of man that I'm chiefly thinking of. It is conceivable that human intelligence may have its roots in lower species. But there's something higher even than that which we have to account for — something we can only call — well, soul. All the proof in the world of the evolution of the brain isn't going to account for that. That is a plus you can't explain." . . . And I'm inclined to agree.

But let us look at the evidence.

Some years ago I knew a man who had spent his life in research on the brain. In mid-career he had a stroke which paralyzed one side of his body and rendered him speechless. Lying in bed, he told himself, "I'm not finished yet. I *will* get up. I *will* walk — a step at a time. I *will* speak — a word at a time. If I must learn all over again, like a child, to walk, to talk — very well, I will."

When finally he conquered, he was a better man than ever. His mind was keener, his speech more beautiful, his will stronger. Like Pasteur he did his best work from then on. It was then that Dr. Tilney wrote his two great books, one of them monumental — *The Brain from Ape to Man*, the acknowledged classic in its field. Let us glance at the proof of the evolution of the brain he presents.

There is the proof in the human embryo.

No one could invent such a story as the human embryo tells — a story it has been repeating, over and over again, in every human birth since the very first, and no one, until recently, had ever read it.

Do we, from our conception, proclaim our independence of every other species on earth? Intimate, by any smallest difference, that we are a separate, special creation? We do not. Nowhere in our bodies is there any organ, no, not so big as a pinhead, which does not exist in the body of an ape — and in many other animals. Nowhere in the brain is there a mechanism peculiar to man alone.

A man cannot become a man except by recapitulating in his own body the story of his descent from the lower animals.

Every one of us, before birth, recites in his own body the story of evolution, repeating over and over, "Once I was a fish, once I was a reptile, once I was an ape, now I am a Man."

And so with every species, the embryo bird reciting, "A bird was once a reptile, a reptile was once a fish, a fish was once a sponge — and this you may know by seeing that I am each of these in turn."

Now is there any evidence in the brain of *its* descent from lower species? Indeed, yes. The brain is the star witness to our oneness with the animal kingdom. It states in unequivocal terms that mind is not a divine addition made to man somewhere along the road of evolution but something possessed by all the rest of creation and in him brought to its, so far, highest point of development.

Speaking of the evidence of evolution contained in the brain itself, Dr. Tilney declares that it is not circumstantial, but direct and unimpeachable, leaving no point in the long line of our descent to be decided by inference.

In his many experiments with the brain, Dr. Tilney himself demonstrated some of the steps in this chain of evidence, in which there is not even a single missing link. As the brain develops in the human embryo, it swiftly and lightly recapitulates the story of the evolution of brain from sponge to mammal, during the first two months faintly resembling each in

turn. At two months it reaches the primate level and now the evidence becomes clear and overwhelming.

From this point on the links in our descent are recorded in the brain in language so clear that if it were the First Reader it couldn't be any plainer. If we trace the development of the primate brain in existing species, moving steadily from lower to higher species — from lemur to New World monkey, from New World to Old World monkey, from monkey to chimpanzee, to orangutang, to gorilla — we see it becoming ever more complicated until in the gorilla it is almost human. These stages, every one of them, are faithfully reproduced by the human embryo brain as it develops, till it, too, is almost human, and finally, at birth, completely human.

When you have once followed all these steps in this evolution of the brain in the human embryo, and compared them with the stages of its evolution in the primates and in the fossils of prehistoric men and animals, you could no more doubt man's descent, body *and* brain, from the first unicellular organisms than — than standing on top of the Great Pyramid of Gizeh you could doubt that you had arrived there by climbing every one of those hundreds of dizzy steps, incredible though that appears.

We have, in the story of the evolution of the brain, arrived at the primate stage — at the great apes. That is still a long way from man, even in mere intelligence, to say nothing of the other qualities that constitute humanity. There is a wide, wide gap here. Can it be bridged? Can we establish this last link between ourselves and the rest of creation? We have touched upon the evidence of this final step contained in the brain of the embryo human. But is this enough? It convinces an anthropologist or a neurologist. Does it convince us, simple creatures that we are? And even if we admit the evolution of the brain, does that necessarily commit us to the evolution of the mind — the soul?

There's only one way to find out — to continue with our story.

We have arrived at the point where the apes began to use a foot as a hand. May this new device lead to the next step in evolution? And if so, by what odd and unforeseeable twist?

It is 1914 and we are in the Canary Islands off the coast of Africa. . . .

## *Almost Human*

**D**URING the First World War, a German scientist found himself stranded for several years on a little group of islands off the coast of Africa where you or I would probably have beaten out what few brains we have in sheer ennui during the first month.

Not so Professor Köhler. He had his chimpanzees.

He had been sent to the Canary Islands by the Prussian Academy of Science and told to find out all he could about apes. Now he'd have plenty of time.

Anyone who wants to find out just how fine is the line which separates man from ape, and if that line can be crossed, has only to study the chimpanzee, which is but a step or two below the gorilla in intelligence, which is the next step below man. . . . And Professor Köhler wanted to find out.

Here, if I may be permitted to paraphrase an eminent German scientist, is, in substance, what the Herr Professor learned about men from apes.

"My chimpanzees," he reports, "are all playboys. They think only of enjoying themselves — and are far more successful at it than most humans. I can't help feeling, as I watch these fellows, that humanity was meant to be a jollier race than it is.

"This morning I put some long poles into their stockade. Did they attempt to do anything useful with them? They did not! My bright Chica grabbed a pole and began using it to jump with, like a child with a pogo stick. Soon all the others were at it, leaping about in a delirium of delight.

"Then they caught sight of the bunch of bananas I had

hung out of reach, and at once they became solemn, eying each other thoughtfully as if to see who would get the big idea first. As usual it was Sultan. (There are Newtons even among apes!) He began jumping with his stick higher and higher, each time trying to seize the fruit — and at last he got it.

“No other animal would use a stick that way — as a tool. And the reason an ape will is that he has an *almost human hand* with which to grasp the stick. . . . Hand and Brain!”

“Today I slipped some hollow bamboo poles into their stockade — and as usual that bunch of bananas high overhead. They tried reaching them with the sticks. Too short. Flinging the sticks at them. Too light. Finally Sultan hit upon the one and only way — fitting one stick into the other. He could not have invented this tool without those *almost human hands*. . . . Hand and Brain!”

“This morning several boxes go into their cage. Will they use them as I would?”

“Pleasure before business. They roll the boxes about with the jolliest racket, toss them to one another, go to bed in them. Finally they begin their attack on the bananas. Nothing else being available, they eventually turn to the boxes. It is Sultan, the gifted, who again spans the gap between animal and human intelligence. He tries standing on one. Not high enough. He catches sight of two piled up in a corner. He drags them beneath the fruit. Still not high enough. But it gives him an idea. Three boxes! They all rush it — and knock it over. Good game! They play at that until they are bored, then back to the bananas. Eventually they agree to let one chap mount the boxes alone — and as soon as he grasps the fruit they snatch it from him.

“Apes can build. And again it is because of that *almost human hand*. . . . Hand and Brain!”

“They have never seen a human being eat. Today I threw a handful of twigs into their stockade. At lunch time, not being

able to tear themselves away from these delightful new toys, they held them in one hand. Finally one chimp, more in a spirit of fun than experiment, dipped his twig into his food and conveyed a twigful to his mouth. Such a bedlam as broke loose! Such admiration for the inventor of this new game! Soon the whole lot were eating like humans — and tickled pink with their cleverness.

“Given the *almost human hand*, they are insensibly led to do the almost human thing. . . . Hand and Brain!”

“When a special feast is spread before them, they are like a group of boon companions in a club. In their delight, they dig one another in the ribs, seize and shake one another by the shoulders, as one who says, ‘I say, old man, do you see what I see?’

“If there is liquor, and there sometimes is, they hug themselves with delight — and get very, very drunk and wake next morning with the most human hangover. They express their distress with the same gestures men use, holding their heads, grabbing and leaning against a fellow sufferer. To their almost human emotions, whether of joy or of grief, they give an almost human expression.”

“Given an assortment of clothes, they became a veritable vaudeville troupe. They dress up in some appalling costume and rush out to terrify an unsuspecting brother. They dress up and preen themselves before a mirror, simpering and giggling. They dress up and march about single-file, beating their feet in martial rhythm; they are a parade. Then each one puts on a comedy act. If they don’t actually laugh, they *all but* laugh, giving a series of rhythmical gasps and grunts very like laughter indeed. . . . Here we see at least the beginnings of drama, of music, of a sense of humor.”

“Their dearest delight is to watch children at play. It would seem that they regard children as exceptionally clever chimpanzees. At such times they certainly smile, a very kindly, human smile.

"I have seen them, when in great perplexity, scratch, as a human does, though not always the right place.

"I have seen them weep, laugh, kiss. I really believe that they have a wider range of expression than man — an Englishman, anyway — for their emotion fills their whole bodies. In their efforts to express these emotions, they *all but* — *Speak*.

"All my experiments show that the chimpanzee can invent, can construct, can learn by experience, by experiment, and by *insight* — not merely by imitation. He has a wide range of emotions and expresses them adequately, not as lower animals do, with mere waggings of the tail and indiscriminate scamperings about, but with human gestures. In all this, I find that it is his *almost human* hand that leads him to *almost human* intelligence and behavior."

Thus Professor Köhler.

In every line of his report we read how human is their nature, how simian ours.

Perhaps you may say here, "Granted that these chimpanzees of Köhler's have great intelligence, there is, as I said before, much more than mere intelligence to man. There is that soul of his — that something entirely different from anything we find in these apes, something in which love of goodness, love of his kind, love of beauty play a part. There is not even the *beginnings* of these things in the apes."

Ah, but we have not yet told you all there is to the ape. We can go one or two steps higher than these chimpanzees. We haven't yet come to the orangutang, the gorilla. We haven't come to — John Daniel.

Shortly after the First World War, an English major, returning from Africa, brought to a friend of his, Miss Alyse Cunningham of London, a young gorilla. Would you be pleased? Neither was Miss Cunningham.

But John Daniel, as he was named, had a way with him. In no time at all he had made himself an important member of the family. He lived, dressed, ate, slept, behaved in all ways like a well-bred human. His table manners were superior to

those of the children of the household. True, he was something of a cry-baby — would cry all night if put to bed in a room by himself. True, he was a shade fatuous — would smirk in front of every mirror he passed. True, he was an exhibitionist — would entertain visitors by the hour with his acrobatics and theatricals. True, he was a practical joker — would clown in the window till he had collected a crowd and then, with shrieks of mirth, bang down the shade in their faces. But do these things make him less human?

And he loved the whole human race — especially the children thereof. He would play all day with the three-year-old niece of his mistress, patiently inventing new games for her as fast as she tired of the old ones.

And as for Miss Cunningham herself, he loved her to distraction. One afternoon when she entered the drawing room dressed for a reception, John Daniel climbed into her lap to bid her good-by. Dismayed, she pushed him away, whereat, flinging himself on the floor, he wept in accents so human that all who heard him were greatly moved.

Suddenly he leapt up, seized a newspaper, spread it on Miss Cunningham's lap, and, this time sure of his welcome, climbed up again. The witnesses to this little scene, so human and so touching, could scarcely believe their eyes.

John Daniel was altogether a darling — obedient, honest, loyal, self-sacrificing. If there are other commandments, John Daniel kept them all. So that it is quite incomprehensible how Miss Cunningham, when Messrs. Barnum and Bailey, hearing of his gifts, came to fetch him, ever let him go.

They got him as far as New York, and there, in the old Madison Square Garden, he died of that rarest of maladies, a broken heart. . . . He is now on exhibition at the American Museum of Natural History in New York.

John Daniel does not stand alone. There are thousands like him in the jungles of Africa, where all gorillas, good or bad, come from. Among them are other John Daniels, as good, as intelligent, as he.

In a word: —

Most of the cases of captive gorillas on record prove that, in character as in intelligence, the gorilla and man must be bracketed together as against all other species on earth.

But at this point in their evolution, the gorilla stage of intelligence, the apes abruptly came to a halt. The ape hand never attained that extra cunning that would have pushed them over, by that odd, unforeseeable twist, into humanity. Obviously we are not descended (however closely related we may be) from any existing species of ape. So far, those who object to an ape ancestor are correct.

But Darwin never claimed that we were descended from these apes. He merely postulated, for us and for the apes, a common primate ancestor who walked this earth some twenty-five million years ago. Two branches split off from this common apelike ancestor. One branch (including all the primates except man) never rose higher than the anthropoid apes. The other, in millions of years, gradually ascended all six of the great steps of primate evolution, arriving eventually at man.

In this evolutionary chain, there is today no Missing Link, as there was in Darwin's day. Many claimants for that honor have recently come forward and magnificently qualified. We shall do no more than mention a few of these remote ancestors of ours — these subhuman, almost human, perhaps human, and beyond-a-doubt human creatures whose fossil bones have recently been unearthed. There are *Pithecanthropus*, *Sinanthropus*, *Eoanthropus*, Heidelberg man, Rhodesian man, Kaman man, and Neanderthal man.

Now what interests us in this welter of paleontology is that the skulls of these missing links do unquestionably show, in size and shape, a steady progression from small brain with low intelligence to bigger brain with better intelligence — from apelike to manlike brain. *Pithecanthropus*, for example, had a brain exactly halfway between the largest ape-brain known (gorilla) and the smallest human brain known (Australian aborigines) — and that, I submit, is coming pretty close to being a missing link.

When you get a chap like *Sinanthropus*, found fossilized

with some pretty smart tools beside him and unmistakable evidences of a fire about, you are going to expect an even bigger skull — and you are going to find it. Not only bigger but definitely more human, with a higher vault and a better-developed forehead.

Bigger brains and better tools. The *hand* at work again. At work making tools, at work expressing emotions in gestures — a caress, a threat, a plea, a warning, an overture.

And now at last comes that odd and unforeseeable twist by which the hand was to lead to humanity. Gestures, facial expressions, articulate sounds, become increasingly meaningful; human emotions struggle for fuller expression — struggle to pierce the barrier of *dumbness*. We are so close to the point where humanity breaks through that we hold our breath.

Now we come to the biggest moment in evolution.

Let us go carefully. It is no simple matter, this *speaking*. It is, indeed, the most complicated process carried on anywhere in the world. And it is, beyond all doubt, the basis of our humanity. In investigating its origin we must proceed cautiously.

To go back a moment. John Daniel, for all his humanness, could not speak. *Pithecanthropus* did not really use human speech, nor did any of those other prehistoric gentlemen, up to and possibly including the Nordic Neanderthal. He may have had command of a limited number of symbolic sounds but probably he did not use what would, strictly speaking, be called language. Speech didn't come in a sudden burst of glory, but, like the use of the hand, slowly and painfully, through the efforts of many races of men.

We haven't the brains of any prehistoric men to compare with the brains of modern men and so try to discover when and how speech came. The best we can do is to compare the brains of existing apes and men and see what it is in the brain of one that is lacking in the brain of the other — what keeps one dumb and enables the other to invent and use language.

Here we come suddenly upon an astounding fact. What difference is there between the brains of men and apes that gives us speech and denies it to them? *None!*

Let me quote authority.

"The entire pattern of the coils in the superbrain of the ape," says Dr. Tilney, "is similar to man's. The frontal coils are not below man's. The counterpart of each human convolution is present, only slightly less complex. We can identify all the chief characteristics of the human brain. Indeed, man's frontal lobe is only a highly complex facsimile of the ape's. The gorilla brain is the most advanced of all apes, is, in fact, *almost human*."

Dr. Tilney, after a lifetime devoted to research in the brain, could find no anatomical mechanism in the brain of man not present in the brain of ape.

Dr. Papez, for all his instruments and measurements, for all his gray hairs and puckering brows, can find no such mechanism.

Huxley, the first scientist to announce this embarrassing fact, said unequivocally: —

"So far as cerebral structure goes, it is clear that man differs less from the chimpanzee and orang, than these do even from the monkeys. As to the convolutions, the brains of the apes exhibit every stage of progress, from the almost smooth brain of the marmoset to the orang and the chimpanzee, which fall but little below man. . . . The human brain has not even *one* peculiarity not found in the ape brain."

They've been at it, these scientists, ever since Darwin's day, and still they cannot find in the human brain any organ, any additional or special collection or arrangement of cells — no, not so large as a pin point — which does not exist in the brain of the ape. To the microscope, as to the naked eye, no slightest anatomical difference is discernible.

And yet — !

And yet they are ape and we are man — and there *is* a difference, vaster than the Grand Canyon, wider than from Pole to Pole, farther than to the farthest star.

If we are to prove our contention that the mind of man is the product of evolution equally with his body, we must find in these two brains something to bridge this gap. Can we? Or are we at an impasse? Does science fail us here, or can we, some-

how, discover in this mysterious conglomeration of gray matter the secret of man's superiority over all other animals?

Let us see.

What we are looking for is some mechanism in the brain which will explain speech. The microscope does not reveal it. But there may be other ways. Suppose we go back about a hundred years and see where science stood then in its knowledge of the brain.

It was tough going for science in those days. Brains were hard to get hold of. Even a doctor of high standing had to be very wealthy or very lawless (and usually both) to get even a meager supply. Ignorance and religion worked together to keep man from invading the sacred precincts of the skull. So if you needed brains for scientific research you bought them at cutthroat prices from those who had no scruples about where they got them.

But some men are lucky.

In the early years of the nineteenth century, a French doctor, introducing an English surgeon to a medical congress in Paris, wound up, "Gentlemen, enough for today. You have seen Charles Bell!"

Never heard of the fellow? Not surprising. Yet Bell discovered more about the anatomy and physiology of the brain in thirty years than the entire medical profession had in the preceding sixteen centuries. Not a step beyond where the great Greek physician, Galen, left off in 200 A.D. had anyone gone in over sixteen hundred years.

One reason, of course, was the lack of brains, dead and alive, to study. The law, conscience, and human endurance were all against medical research on the brain. Now it's a hard thing to say, but war has done more for surgery and our knowledge of the body, including the brain, than any other factor. And Bell was a wartime surgeon.

Sir Charles saw a lot of brains in his day—saw them in a condition in which you wouldn't want to see a pigeon's brains, and the men still living. With brains salvaged from Waterloo and other Napoleonic adventures, he took microscope, probes,

knives, and pencils in hand, and gave us our first real maps of the brain. He gave us, too, our first descriptions of the nervous system, traced the nerves from their endings in the organs of sight, sound, touch, taste, smell, back along their courses to their source within the brain. One set of nerve fibers, he found, is stimulated by the changing pictures impinging on the retina of the eye, and transmits these impressions to a special collection of nerve cells in the brain, thus producing vision. So with the other senses. These messages are relayed and co-ordinated by processes known as recognizing, thinking, and deciding, and the resultant orders are sent out along a different set of nerves, causing the muscles and organs to act as the brain wills.

The first set of fibers is called the afferent nerves (ingoing) and the second the efferent nerves (outgoing). It was by tracing these nerves back and forth that surgeons were able, in 1870, to locate definitely in the brain the various centers of the five senses.

So of course Bell became the Father of Neurology. That was the first step toward studying the brain.

Then one day in 1846, standing in the operating room of a Boston hospital, a young dentist, Dr. William Morton, having just administered a drug to the patient, turned to the surgeon in charge and said — the words ring down history — “Sir, your patient is ready.” And the surgeon then performed the first public operation under an anesthetic in medical history. . . . Thus was it made possible to enter the *living* brain as well as the dead.

Way back in 1632 a Dutchman had invented an instrument which could reveal the secrets of the hidden recesses and cranies of the body, yet for almost two hundred years the ever-conservative medical profession still looked upon the microscope as a decided novelty, of small use to a doctor. So it was inexcusably late when they finally turned it upon the brain.

Then they discovered that although, like all vegetable and animal tissues, the brain was made up of cells and their products, this tissue was profoundly different from any other tissue in the entire body — from any other tissue in the world.

This was utterly unexpected and very strange. Why was it different? For what purpose?

The most enlightened scientific opinion had previously held that the brain was a gland, secreting thought somewhat as the adrenals secrete adrenalin. But now the microscope showed them that brain tissue was less like glandular tissue than it was like any other bodily tissue and that it secreted *nothing*, least of all *thought*. Naturally, the next step was to investigate this strange new tissue minutely to discover what it did and how.

Now at last they were on the right track, ready for the great adventure — the search for the actual physical source of the mind of man. They knew that the brain was the seat of sensation, in control of the nervous system, and of consciousness. But was it the source of the higher faculties? And if so, the proof? The brain of the ape would certainly fully account for all the mental processes of an ape. But did the brain of man fully account for man's mental processes? If so, the proof, the proof!

For anyone who would undertake this adventure, there were several facts to go on.

We know that there exists in man *something* — call it soul, call it the spirit of humanity, call it the genius of mankind — which is possessed by no other animal. That *something* enables us to build the Parthenon while the ape can, at best, pile up boxes.

"Estimated by his accomplishments," says Tilney, "it seems necessary to assume the existence in man of some special power different from all other living creatures. Its source is the secret of our supremacy."

Since the brain is the one instrument in the world capable of forming thought, we must, if we are to account for man in *physical* terms, find in the brain some mechanism that explains this special power in him, this genius of mankind.

But this mechanism, we have seen, is not discoverable by the microscope. Nothing *visible* in the brain of man, so exactly like the ape's, accounts for his superiority.

So we must find some other way.

We have still another fact to go on. We know that a chief

distinction between man and the other animals is — speech.

Therefore what we have to look for is some mechanism in the brain, some sub-microscopic mechanism, by which speech is produced.

But I hear you say, "Hold on a minute. Speech — certainly that's important. And of course it's one of our great advantages over the animals. *But* — what *you're* saying is that *it is practically the same thing as thought*. And it's not. Not by a long sight!"

No?

Stop right where you are and try to do a little thinking, even the most elementary, without words. Can you?

Not only that, but the number of words a man uses are the best measure of his intelligence. When a human being ceases to acquire words, he has reached the ceiling of his intelligence. He will go on thinking but only with the ideas (the words) he has already acquired. The larger the vocabulary of an individual, the higher his intelligence.

You wonder? Well, here is a common-sense proof.

A few years ago the Telephone Company decided that it would be valuable to know what constitutes executive ability. I imagine all of us would like to know that, wouldn't we?

So they sent their major executives, forty of them, over to Johnson O'Connor, head of the Human Engineering Laboratory of the Stevens Institute of Technology, in Hoboken, N. J., to see if he could find out.

Mr. O'Connor knows a lot of ways of finding these things out. He has tests for just such purposes — tests of engineering, mathematical, musical ability, I.Q. tests, personality tests — all that sort of thing. When he is through with you, he can give you a pretty good mental map of yourself.

Everything was going finely and Mr. O'Connor thought he was really getting somewhere when suddenly one of these major executives, up till now one of the most docile of the forty guinea pigs, staged a one-man revolution — just planted his legs and said he'd be hanged if he took another one of their idiotic tests.

Well, what test was it he especially objected to, Mr. O'Connor wanted to know.

Oh, no one test in particular. It was simply that the whole thing was ridiculous. He was fed up.

What was the next test on his schedule?

Oh, some sort of word test, he thought. No use talking about it — he was through. Fun was fun.

But Human Engineer O'Connor has had considerable experience in handling the human mule. In the end the mutinous major executive was led to the laboratory. He took their silly word test — the object of which was to determine the size of his vocabulary. He made just two errors where the average college graduate makes twenty-seven — the highest score of any of the forty major executives.

Now why was this gentleman so coy about the vocabulary test? Well, he was an uneducated, self-made man. On raw ability he felt he could stand comparison with the college-bred executives of the company, but when it came to language, a matter of formal education, he was afraid he'd be shown up. He was. He proved once more that a man of ideas is a man of words.

Given a group of men, this vocabulary test picks out the executive from the employee every time. Not only that, it picks out those who are *going* to be executives and those who are not — and years later the facts prove the test almost 100 per cent correct. It is found that successful people, whether in the professions or in business, are almost invariably those who get the highest ratings in this word test. Where the high-school freshman averages 76 errors in the test, the college graduate 27, and the college professor 8, what do you suppose the major executives of large companies average? . . . The answer is 7 — fewer errors than college professors! Words *are* ideas.

Milton's intellect, we realize as he unrolls heaven and hell before us, was profound. And if we count up the words he used, we shall see why. Fifteen thousand words! Compare that with the average man's few thousand and the ignorant man's few hundred.

But Shakespeare towers over Milton as Everest over Mont Blanc, and the reason becomes clear when we find that his vocabulary is 25 per cent larger — twenty thousand words.

So now may I say that what that bold adventurer who would seek the key to our humanity had to look for was — the mechanism in the brain which produces speech?

Such a man came forward.

He put it this way to himself: —

“I want to find that region in the brain of man where something takes place which takes place in no other brain on earth, where the barrier between ape and man, thin as a membrane, is shattered, and speech breaks through. I want to find the actual physiological bridge between the highest animal and the lowest man.”

Can he?

If he can we will at last be well on the way in our search for the seat of the mind of man. Until we know where mind is and what it is, we can't hope to understand how it works, in sickness and in health, and how to improve it. And that is what we're trying to discover.

I take you to a hospital in Paris in 1861.

### III

## *Dead Men Do Tell Tales!*

A MAN lies dying in the hospital of Bicêtre in Paris, an anonymous pauper who has lived at the public expense for twenty-one years, forgotten even by his relatives.

For twenty-one years he has been heartily disliked by everyone who has come in contact with him — attendants, fellow inmates, doctors. He is notoriously bad-tempered, selfish, and vindictive, besides being as much of a thief as it is possible to be in a public ward. No doubt he has a name but no one knows it. He is called by everyone simply "Tan."

For twenty-one years Tan has not spoken a single word except that one syllable *tan*. Not that he hasn't tried. Twenty times a day he becomes purple with rage in the effort to speak, so that you can fairly hear the curses exploding inside his head. No doubt of it, he knows a lot of words he can't utter — most of them bad.

Besides having a thoroughly bad character, Tan has only a mediocre intelligence, and both have grown progressively worse during his twenty-one years at Bicêtre.

Yet the brain of this nonentity is to become one of the most famous in the history of humanity.

One day Tan is so ill that he is transferred to the surgical ward and comes under the attention of a young surgeon. This surgeon who already, at thirty-seven, has had a career rarely equaled for its rapidity and brilliance is, after the first glance, not at all interested in the gangrenous leg which has brought Tan to him (he sees at once that Tan will be dead of that in

a few days) but, quite inexplicably, he takes an immense interest in Tan's one-syllable vocabulary.

He knows he has only a few days of Tan's life left to him so he must work fast. He calls in all the doctors, attendants, inmates, relatives who have ever known this pauper and questions them endlessly, writing down every trifling bit of information they can give him. Then he sits by Tan's bedside and talks to him, examines and tests him in every conceivable way. He even brings in a bigwig doctor or two to have a look at him — not at his leg (that is merely the stop watch being held on Tan) but at his throat, his chest, his face, tongue, lips, his paralyzed right arm and leg, his paralyzed left cheek and eye. He tests Tan's hearing, sight, memory, intelligence; makes him pronounce his famous *tan* over and over, but not nearly so often as he'd like to. He would like to spend his entire days and nights at Tan's bedside but, as he says in his report, "It would have been cruel to question him too much."

Six days after he enters the infirmary, Tan is dead. Twenty-four hours later his body is on the autopsy table. Twenty-seven hours after his death his brain, this brain which is to become famous, is out of the skull which has housed it for over fifty years and on the table ready for dissection.

We come now to the moment when the young surgeon, who takes a greater interest in Tan than have all the other people who have ever known him put together, sits in his laboratory with the brain of this nonentity before him.

He has a question to ask it — one of the most momentous questions man has ever asked. And he believes this dead brain can answer what the living brain could not.

"Why are you so keen on the old fellow's brain?" we can imagine one of his colleagues asking him. "Old Tan hasn't spoken a word for over twenty years."

"That's just why I want to examine his brain."

"But why the brain? Why not the vocal cords?"

"Oh, his vocal cords were all right."

"Well then, his larynx, pharynx, epiglottis, palate — any of his articulatory organs,"

"I've examined them all. They functioned perfectly. His *tan* was a masterpiece of pure articulation."

"Well, but wasn't he a little —?" The doctor taps his forehead.

"Absolutely not. I've been all through that. No — his mind was perfectly sound. Able to *think* all right — just couldn't talk."

"Well then, if there was nothing wrong with his mind, *why* do you want to examine his brain? . . . Oh, never mind, never mind. You're probably up to some hocus-pocus with that microscope of yours!"

The young surgeon, who is already famous but is now on the verge of becoming very famous indeed, grunts as he sits there looking at Tan's brain.

"You and your microscope!" the older men were always taunting him. They didn't take much stock in the microscope, though it was over two hundred years since it had been invented and Pasteur was even then making himself a great name with it. It might come in handy to peer into the witch's broths of that eccentric old professor, the doctors thought, but for human anatomy — bah! If a doctor needed a microscope in those days he had to send around among his confreres to borrow one.

But here sits our young surgeon with his microscope and his brain of a man who couldn't speak, and hopes to solve the most important problem in the world, no less.

"Speech," he muses as he gazes on this brain. "That is the beginning of our humanity. If I could find out *what* speech is, *where* it is, *how* it got there, I would know more about the nature of man than if I studied philosophy and theology for a thousand years. I would know what makes man *man*."

"Here is the brain of a man who couldn't speak — but who once did speak, up till the day he was thirty years old and had an epileptic seizure. He was in all ways but this a healthy man, even for the first ten years after he lost the power of speech. Then came this creeping paralysis, first down one arm, taking two years to finish it off and reach the leg. Two years more seep-

ing down the leg and then seven years in bed while death crept over him, taking him inch by inch.

"He couldn't speak. But he was not wordless. On his death-bed he knew French as well as he'd ever known it. He expressed what he meant in elaborate gestures, he understood everything that was said to him, he could read, he could write — until he lost the use of his right arm. His memory for words was intact and his organs of speech — of reception and emission — were perfectly capable of functioning properly. *Then — why — couldn't — he — speak?*

"If I knew that, if I could find out where his power of speech once was and why it disappeared, I would at least have made a beginning at understanding why man is higher than the animals. . . . It is strange that a man doesn't know where his words come from, doesn't *feel* them, doesn't feel *thinking*. Well, where *are* words, which are thoughts, made?"

It looks like a waste of time, doesn't it — this young surgeon sitting there with his microscope and this dead brain asking himself these questions? Even if it were a *living* brain and were in a glass skull, the most powerful microscope could not detect the processes of thought and show words being manufactured. How then find the answer in a dead brain, for twenty years speechless?

But it is 1861, and Darwin has written and psychologists are saying to themselves: —

"What we want to know is what mind is. Very well. Let us take a long, cool, scientific look at what we can actually see. Let us take a look at the brain."

"Let us take a look at the brain," says our young surgeon with the brain of Tan on his autopsy table — and with these words we are at the beginning of a line of research which will lead us to unimaginable discoveries. We have started at last to look in the right place for the "seat" of mind.

Who is this young pioneer of a new science?

He is Paul Broca. He was born a prodigy, in 1824. His prodigiousness was announced to the world in his first wail when it was seen that he possessed two large incisor teeth, a distinction

he shared with the prodigious Mirabeau and Louis XIV. From that moment on he constantly held the fascinated attention of his contemporaries. He entered college at an age I dare not mention to walk off at seventeen with three diplomas — Bachelor of Letters, of Mathematics, and of Physical Sciences. He was a full-fledged doctor at twenty, when most men today are just entering medical school. At twenty-four he was being handed medals, honors, prizes, and positions — everything that those who had the giving of them could lay their hands on.

He became famous in so many ways that it is difficult to believe the record. By the brilliant researches into the histology of cartilage and bone which he made with his despised microscope. By contributing more to the science of surgery by the time he was thirty than any other man of that age in any time or any country. By creating the science of craniology. By inventing so many instruments for measuring and studying the brain and skull that a mere list of them would cover pages: for measuring them inside and out without sawing the cranium open; for measuring them dead or alive; for measuring their thicknesses, angles, profiles, capacity, weight, facial angle, relation to the spinal column — more measurements than anyone had even thought of till then and nearly all that have been thought of up to now.

By creating the science of anthropology, which is at least nine other sciences. By founding the School of Anthropology, ditto Laboratory, ditto Society. By doing brilliant work (everything he did was brilliant) in the comparative anatomy of the primates. By making outstanding investigations into the functions of the human brain. By writing hundreds of books and articles (fifty-three papers on the brain alone) on scientific subjects — and nothing he ever wrote was mediocre. By being an eloquent public speaker.

Where work was concerned he knew no day and night. Tired, he sought rest in more work. Finally exhausted, he flung himself upon further work till he was sufficiently refreshed to go on indefinitely.

Above all was the character of the man. Those who knew him

are clearly not to be trusted, they were so violently prejudiced in his favor. Their accounts seethe with adjectives — “generous, benevolent, kindly, unflinching honesty and courage, adored, never made an enemy and never lost a friend, noble, Christ-like.” It’s too much. The man was a monster of virtue.

And, if you must know, in addition to all this he was an outrageously handsome man.

Altogether he was one of those men — how many are there? — who make us exclaim, “*That* was what men were meant to be!”

So now when we see Paul Broca bending over the brain of this dead Tan, asking it a question that has never yet been answered, perhaps you will think, “Here is a man who, if anyone can, should be able to tell us what we want to know.”

Broca has a theory. This is how he puts it to himself.

“This man could once speak. Suddenly he lost the power of speech — but not of understanding speech. Nor was he dumb. Therefore in some part of this brain there must be a station for uttering words, which is distinct from the station for hearing and remembering words, distinct from the station for reading and writing words. This station was, in one moment, in a flash of epilepsy, wiped out by some injury to the brain. Now if I could put my finger on that injury . . . !”

It was as when Columbus said to himself, “If I sail steadily west I shall come out in the east — in India.” Only instead of India, it was a far more important land Broca sought.

“This Tan had a progressive cerebral lesion,” he continues. “Witness the slow paralysis of the body, creeping at the end even into the pharynx.

“That makes it harder to discover the original lesion. If Tan had died that day he lost the power of speech, and if I had gotten his brain then, I could have seen at a glance where the injury was that destroyed speech. But now the disease has gone so far — why, look, no part of either hemisphere of the brain is in a healthy condition. All has gone soft in that terrible, slow dissolution of the brain. Still, since the disease *was* progressive it must have started in some one spot and spread from there. *That* would be the spot the injury to which struck

Tan speechless. Since his first symptom was speechlessness, it must have been the result of his first injury. So if I can find the place where the softening *started* . . . ”

Now he is on his way.

He does not merely sit there regarding this dead brain and, like the metaphysicians, spinning speculations. No — he is a surgeon, a man of knives and saws, probes, and all those complicated measuring and weighing instruments which he had invented for just such purposes.

Cutting with infinite care into the soft mass of the brain, he sees at once that what he has to deal with is not a tumor or an abscess, for here is no mass formation but an actual loss of substance in the cerebral tissue, which is filled with liquid. Part of the left half of this brain has been gradually and completely destroyed; the whole is unhealthily soft.

“Now it becomes clear,” he says, “that the first onset of the softening must have occurred at the spot where I find the greatest loss of substance. The disease then spread from that point out, by continuity of tissue. The point where it originated must therefore be looked for, not among the organs which are now soft or in process of softening, but among those which are completely destroyed, those that have lost the most substance.”

You can see now how the mind of a scientist, not of a philosopher or a theologian, however profound, tackles this problem. Here is a man determined to believe only what he sees — but also determined to see all there is to see.

We cannot follow Broca through the intricacies of dissection, through the explorations of the lobes, convolutions, furrows and nerves of the brain, a mechanism so intricate that the most complicated machine ever invented by man is clumsy and childish in comparison. We cannot follow his careful scientific observations, his subtle reasoning. We can only announce his epochal discovery: that at last, in the third left frontal convolution, in a place to be known forever after as “Broca’s convolution,” he came upon the *foyer primitif*, the place of origin of the lesion which had made Tan, thereafter to be known as

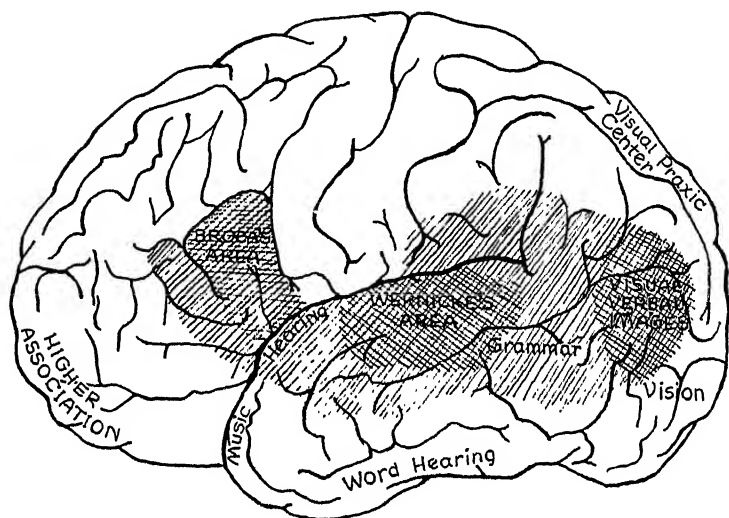
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*The following portrait of Shakespeare,  
drawn from the death mask,  
shows the great Association Areas of the brain  
where the higher mental processes take place*

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Lateral view of the left hemisphere of the brain  
showing the location of the Speech Areas



Shakespeare's vocabulary of 20,000 words was one of the largest that any human being has ever possessed. All these words were stored in the Speech Areas of his brain, located in the left hemisphere exclusively. Broca's area is the center for uttering words, Wernicke's area for understanding speech, the visual verbal area for reading. These various Speech Areas, working together, form a basis for thought; in general, the larger a man's vocabulary the higher his intelligence.

In the Association Areas (shown opposite), it is now fairly well established, the higher intellectual processes take place — that synthesis of all the activities of the brain which results in thought and action. Some authorities hold that the Frontal Lobes combine the centers of association, memory, imagination, perception, and all the higher intellectual faculties, as well as those of voluntary control and aesthetic, moral, and religious feeling.

Since none of the motor and sensory areas are located in this region, this theory is not improbable though it has not been established. What has been established is that there are definite Speech Areas, definite Motor and Sensory Areas. (See drawing of Napoleon's brain following page 268.)

At the front of the brain, in the Frontal Lobe, is the Frontal Association Area, and in the Prefrontal Lobe (immediately behind the forehead), lies the Higher Association Area. Other Association Areas are also shown in crosshatching.

Brain Number 55 in the Musée Dupuytren, an inmate of Bicêtre for twenty-one years.

And now he reasons: "If the ability to speak can be removed by an injury to one, and only one, small portion of the brain, isn't that the same as saying that *here*, in this particular spot, and nowhere else, is the seat of speech? And if the seat of speech, then also a center of thought, for without speech little true thinking is possible. A certain portion of the brain, upon which I can put my finger, then holds the secret of man's superiority to all other animals."

We can go no higher than this. To be led to the very threshold of reason, to the place where certain processes of thought actually occur, this is a high moment in man's search for his soul. We are on the actual scene of the physical source of a purely mental process. We are in the place where the material becomes spiritual. Here the transformation from animal to man takes place. In his brain, and his alone, does this miracle of speech occur.

A sensation from the outside world impinges on a nerve, rushes along a nerve fiber to its end at a physical stopping place in the brain where it becomes a conscious perception. Still following a nerve fiber, this perception rushes to *its* physical end where it is translated into sounds — into speech. Speech is the one human endowment which is so associated with thought that thinking is almost impossible without it. We can *feel* without words, not truly think. The immeasurable distance between man and the ape can, we see if we trace the evolution of this transcendent faculty, be largely accounted for by speech.

To the place where this miracle occurs the microscopic observation of facts, the lock-step reasoning of science, has at last brought us — to a place where all the philosophy and the theology of ten thousand years have never brought us.

Now you see how we are beginning, by studying this long-neglected organ, the brain, to get a little light on the subject of mind. As we go on we shall see that light grow and grow until at last, where so short a time ago all was darkness, we have at any rate a cheering dawn.

But one swallow does not make a spring — and one case never yet constituted proof. The long arm of coincidence is never so long as when it is reaching out to confound some young scientist, however brilliant, in a new field of research. *The Case of Tan*, yes — interesting, very interesting, said the doctors. A few medicos read about it, thought it indicated possibilities. . . . But the medical profession is notoriously heavy on its feet. They call it being conservative. They wanted further proof.

Broca himself was the worst.

"We must have other cases," he insisted. "We must find out if *always*, with loss of speech, there is injury to this same spot."

But these cases of *aphemia* (the abolition of articulate language with preservation of the activity of articulation and of the general faculty of language), as Broca termed Tan's disorder, are not so easy to come by — are, in fact, quite rare. Still, Broca's report had put the doctors on the lookout so every now and then —

There was the case of Bart Mathews.

One morning, at a London crossing, Bart slipped and fell, and as he came down, his umbrella pierced his eye socket. Bart was jangled off to a nursing home.

Well now, not so bad, the doctors said after going over him. Not bad at all, really quite good. Young man, you're not going to lose your sight. A few days in bed and you'll probably see as well as before. Isn't that the best ever?

Bart smiled with the parts of his face that had been left out of bandages and started to say that that was just fine and dandy, and then he found he couldn't — he absolutely could not — utter a single word!

This was amazing! Bart was amazed because he had understood every word the doctors said. But the doctors were the most amazed of all. They brought other doctors running, they tried everything they could think of, and finally they decided that perhaps a good night's rest . . .

Well, when the doctors can't think of anything but a good night's rest . . . ! Of course, Bart went right on trying to speak — to every nurse who popped into the room, to his rela-

tives when they came, telling him that after a good night's rest . . . and to himself when he was alone. But it was no go. He couldn't get out one single word.

The good night's rest didn't help. The devil with a good night's rest! The devil with many good nights' rest. They didn't bring so much as a one-syllable word to his lips. The doctors were very bright at thinking up ways of determining the extent of the damage, though not so bright at thinking up cures. They handed Bart a newspaper. He smiled and nodded. He could read it like Mother Goose. But try to pronounce one word of it! . . . They handed him a pencil and paper. Quick as a flash he wrote, "I can say anything I want to — *on paper.*"

Bart Mathews, poor chap, had served his purpose. He never spoke again. The doctors reported his case to their medical associations, and he went down in the files as one more proof of the theory of partial aphasia, or aphemia, due to injury to Broca's area.

More and more doctors, aroused by these reports, began investigating cases of aphasia — aphasias caused by accidents such as Bart's, head wounds, tumors, abscesses, softening of the brain. Soon they had dozens of cases — soon they had hundreds — soon there could be no doubt of it at all: a lesion in that particular place, the third left frontal convolution, invariably resulted in an inability to speak. Broca's theory was proved!

Good! But for a man like Broca that was just the beginning. There was so much more to know about this faculty of speech, which is as complicated as thought itself.

"Speech is not just *one* thing," he now put it to himself. "Not merely the ability to *utter* words. A general faculty of speech presides over all our modes of expressing thought. Speech is the faculty of establishing a constant relation between an *idea* and a *symbol*, whether that sign be a sound, a gesture, a figure, or any sort of mark whatever. Speech takes the form of spoken words, printed words, gestured words, even, with the blind, of *touched* words.

"Now I should surmise that each of these forms of speech would have its own separate and distinct area in the brain.

I believe there must be a center for *seeing* words, a center for *hearing* words, a center for *gesturing* words, a center for *writing* words, just as there is a center for *uttering* words. So what I must do next is to try to locate all these other speech areas."

One day a beautiful thing happened. A woman died in Paris, an intelligent and well-educated woman, who, retaining to the end her ability to speak, had long ago lost the ability to read.

"Now!" exclaimed young Broca. "Now for these famous *visual* speech areas of mine!"

As he sat in his laboratory with the brain of this woman before him, he reasoned thus: —

"I shall find a tumor. Not in the spot where Tan's injury originated — no. Close by? I think so. These various forms of speech are closely related. They act in concert. Therefore, although each must have its separate, independent seat in the brain, since each can be removed without damage to any of the others by an injury to one special part of the brain — as in the case of Tan, as in this woman's case — they must be connected. So I would expect to find the seat of *visual* speech close by the seat of vocal speech."

And in the brain of this dead woman, proceeding cautiously as in the case of Tan, Broca did, as he so brilliantly surmised he would, eventually come upon the center of visual speech — and true enough, close by the center of vocal speech. Here is his second contribution to the discovery of the areas of speech.

"But this faculty of speech," you've probably been saying to yourself, "is more complicated than it at first appears. You've explained very nicely *where* it takes place — in Broca's area and associated areas. But *how* does it *work*?"

Fair enough. We must look into that. What are the actual mechanics of speech? What exactly is it that takes place in the recesses of that inaccessible and silent organ, the brain, when we speak?

Let's go at it this way.

A child is born. It is born speechless. Long after birth it remains speechless as an ape, and would remain forever speechless if it were not *taught* to speak. Although all its ancestors

for many hundreds of thousand years have spoken, it has not inherited one little word — not so much as a *dada*. Speech is not even, like that other human characteristic, walking upright, an ability which we would, left to our own devices, eventually acquire. No — it is a thing we must be taught.

We are born speechless — we are born ignorant. If we never acquire some form of speech, we remain ignorant all our lives.

But the child, like any animal, makes noises — noises expressing its feelings. It cries, it crows, it moans. At first these noises, like those of many of the lower animals, are all vowels. New sounds are added in a certain order, always the same order for every child — first grunts, then laughter, then the meaningless imitation of sounds, till, about the twelfth month, it begins to utter a few simple words, first nouns, then verbs, adjectives, et cetera. From then on it moves steadily from ignorance to intelligence in proportion to its acquisition of words.

Now for the process.

At birth, the cerebral cortex (the gray covering of the brain) is in a plastic condition. Most of its cells are in the non-functioning stage, in which potential state they are called neuroblasts. Well, they are something like seeds that will stir when the warmth of the sun penetrates; like a sensitized film which will record an image when the light strikes. That light is usually the *heard* word.

The first words the child hears are received in the acoustic area of his brain. There they make some faint impression but they must be heard again and again before the neuroblasts actually record these sounds. A neuron path must be *tracked* by the repetition of words. When the sounds are recorded the neuroblast, from being potential, becomes active. A neuroblast thus converted is called a neuron. Eventually we have a whole library of neurons.

But yet the child cannot speak. The words so far are registered only in the acoustic area. They are merely *heard* words — not understood, not remembered, not spoken words. They have not yet reached Broca's area.

But the nerve cells and fibers of the cerebral cortex are

continuous. The impulse of the active neurons in the acoustic area travels to Broca's area, the common effector area for speech. Gradually this acoustic area is connected up by neurons with the audito-psychic area—and the process of *remembering* words begins. The same thing takes place in the visual area, the area where word and object are connected. Finally the neurons connect the auditory and visual areas with an association area—and we have the full-fledged faculty of speech. Words are now heard, connected with a visible object, remembered, understood, and uttered! All by converting neuroblasts into neurons.

This then is what takes place in the brain of a child who is learning to speak. Though we cannot watch this process going on in the living brain, we know, by laboratory experiment and clinical practice, that this is what must happen.

The neuroblasts that can do that exist only in the brain of man.

This explanation of the mechanics of speech is, we admit, biochemistry since the life and functions of a neuron are themselves chemical processes. When we say with Berry that ideas are merely words stored up in cortical neurons as a result of previous incoming impulses of sound or sight, we are giving a physicochemical explanation of thought. And many people are going to object to any sort of chemical explanation of their immortal souls.

They are going to say, "Go to! Who ever heard of brain cells and ideas mixing? They can't—any more than oil and water. What you are saying, in plain terms, is that the physical becomes mental. And that, in plain terms, is nonsense!"

It is well to remember that it was the many unscientific explanations of the mind that for so long delayed man's understanding of his own nature and caused the confusion and backwardness of all the mental sciences. It was the neglect of the anatomical and physiological basis of speech, according to the eminent Dr. Kinnier Wilson, that was chiefly responsible for the long confusion concerning our mental processes.

No scientist today rejects this physicochemical explanation

of speech. No other explanation, except this of an incalculable number of neurons storing up auditory and verbal images, even begins to explain the fact of speech, and if of speech, then largely also of mind. And until we had this scientific explanation of mind, there could be no true science of psychology or psychiatry.

So let us hear a little more about this faculty of speech, which throws so much light on human nature.

It is even more mysterious than we have yet seen, and it was because Broca went right on asking those searching questions of his that the mystery was finally dissipated.

The next question he asked himself was this: —

“There are many kinds of aphasia,” he said. “There is *motor* aphasia, the inability to utter words — as with Tan. There is *visual* aphasia, not understanding the printed or written word — like my educated lady who couldn’t read. And there is *auditory* aphasia, which means not understanding the uttered speech of others.

“Now suppose we investigate all the cases of every *kind* of loss of speech which we can lay our hands on? We should thus be able to locate all the speech centers in the brain and eventually discover a great deal about the processes of thought.”

Once put on the trail, the doctors and surgeons proved veritable bloodhounds. They began turning up cases that led to the strangest, the most amazing . . .

There was, for example, the case of Cecil Handover.

Handover was a professor of languages in an English school. He spoke fluently French, Latin, Greek, English, and Oxford — a language all its own.

One day Handover was in an accident in which he received severe head injuries. When he had recovered sufficiently to do a little light reading — he found he couldn’t read! Not a single word of his native tongue, English, was intelligible to him. But this was not the really strange thing about his case. This phenomenon the doctors had observed before. What *was* strange was that one day when he happened to glance at a copy of Aristotle’s *Poetics* in the original Greek — he found he could

read it off like a primer! So they tried him on Latin. Yes — yes, he could still read Horace in the original. But he frowns, falters, shakes his head. No, he can't read it as well as Greek. Strange — for before his accident he had understood the two dead languages equally well.

The thing is even more mysterious. They try him with a copy of *Le Cid*, which he had once known almost by heart. The French text is now practically unintelligible to him. He makes out a few words, a few phrases, but haltingly. English, his childhood tongue, he remained to the end totally unable to decipher. It was all, not Greek, but Chinese to him.

This is getting things down to an even finer point than had the case of Tan or the lady who couldn't read. Not only, it now appeared, were there separate and distinct centers for language *uttering* and language *seeing* and *hearing*, but even separate centers for *each different language*! It almost seems as though the brain, as it becomes more known, becomes more mysterious.

There was only one conclusion to be drawn from these facts: that the brain is a library in which there are separate shelves for each language. With each new language we acquire we add a new shelf in our speech areas and these in turn are separated into compartments for seeing, for hearing, and for uttering these languages. Pretty complicated mechanism, this brain of ours.

Case after case, until at last it was proved up to the hilt that the general faculty of speech resides in the brain; that it has many subdivisions, each with its separate center; and that injury to one of these centers deprives us of *one* method of communication but not of all. Gradually, you see, as Broca surmised, the mind of man is being discovered by means of this faculty of speech.

And *still* Broca is not satisfied. Still he insists that they are only at the beginning. Still he continues with his insatiable questioning.

Do you know what theory of the mental faculties was accepted, in all scientific seriousness, in Broca's day — and by

some people right up to the present day? Can you even guess?

The theory of phrenology! This most pseudo of sciences, which today stands to psychology in the same relation that alchemy does to chemistry or astrology to astronomy, was good, sound science in Broca's time. The phrenologists held (and they were the largest, most popular and wrongheaded group of men in the whole history of psychology) that the bumps on the skull indicated the location of certain faculties. You're mad and want to fight? Under that (in your case, large) bump behind your ear, intense activity is going on; your sense of combativeness is aroused. You see an alluring female and are greatly affected? Beneath Bump No. 1 at the back of your neck (feel it — it's probably warm) the activity is terrific. You are a mathematical whiz? Feel around between eye and ear for Bump No. 28, which should, on your skull, be prodigious. You approve what you see in every mirror you pass and what you think you see in the eyes of every man and woman you meet? Bump No. 10 at the back of the head tells you why — your vanity is overweening.

All this was started in the early years of the nineteenth century by a German physician of no mean scientific attainments — Gall, who was the first to insist that it was the gray matter in our brains which is the really valuable part, but who then went haywire and insisted, "Wherever in the brain there is great activity, there is a massing of gray matter. This naturally produces protuberances on the skull. There is thus a bump for each faculty, and by feeling the bumps we can read character and abilities."

That was, for many, Bible in Broca's day. But Broca didn't accept anybody's Bible — the scientists' any more than the ancient Hebrews'. To all this phrenological rigmarole he merely said politely, "Really?" And back home in his laboratory he said, "I think it's all quite different from what they say. The bumps on the skull indicate nothing but irregularities in the thickness of the bone. All this speculation about bumps indicating mental faculties is pure fancy, and that's what we're trying to get away from. All that we *really* know, all that we've dis-

covered by purely scientific methods (which is all that counts), is that there are several speech centers. But having discovered that much, why not go on? For in that case, wouldn't there be centers for other faculties? And might we not be able to locate them? Not by feeling bumps on the skull, because the cerebral cortex doesn't behave in that way; but by tracing mental abnormalities to their source in the brain. There are, we know, definite, circumscribed areas in the brain where the nerve fibers of the various senses meet — a center of hearing, of seeing, of touching, of tasting, of smelling, and now of speaking.

"Speaking — that is one of the higher faculties. So finding a speech center probably means that the other higher faculties likewise have centers. May we not then hope to locate the centers for memory, knowing, judging, right up to the highest attributes of man — the moral sense and reason?

"I think we may — but not I, not in my day. If all the cerebral faculties were as distinct, as sharply defined as this one of speech, there would be no difficulty about locating them in the brain. . . . Unfortunately, this is not so."

But of course that didn't stop him from trying — not for a minute. He started right in trying to locate these higher faculties just as though he were going to live several hundred years at least.

We haven't, even today, come to the end of the road on which Broca planted his sign saying, "This way to the Mind." But we have come a long way. We have discovered a great deal about these higher faculties of ours and their dependence on the brain. . . . And a lot of it we have discovered by following that first broad trail he blazed — speech.

As we shall now see . . . We enter the operating room of a hospital in Paris in 1940.

#### IV

### *The Animal That Speaks*

ON an operating table in a hospital in Paris lies a woman, Annette Berthier by name.

Mme. Berthier is married, the mother of three children. Strange things have been happening to her of late. She who has always been so good a wife, so loving a mother, has grown ill-tempered, even ugly, with frequent sidelong glances, once with a knife flourished menacingly. She often speaks incoherently, gropes for words, utters meaningless sentences. And she forgets so many things — not only recent events but even the names of the commonest objects and of her children.

So at last, convinced that she is insane, fearing that she will be taken from him and confined in some terrible *maison de santé*, her husband takes her to their family doctor — and here, a few weeks later, she lies on the operating table of a great surgeon, the famous Dr. Vincent of Paris, a pupil of our own Cushing.

A platform stretches over the entire operating table a few inches above Mme. Berthier's body. This is for the surgical instruments. It runs almost the full length of the body. Only the head is exposed.

The head has been shaved. It is bound firmly to a sandbag so that it will not yield to the heaviest pressure of the drills, going through bone. On the dead-white scalp Dr. Vincent has drawn a large rectangle.

Dr. Vincent, looking strange as a man from Mars, clad all in white — white skullcap, a white gauze veil hanging before

his face exposing only the huge goggles, a "head light" strapped like a miner's lamp around his forehead, knitted cuffs and gauze loosely wound about his wrists beneath the rubber gloves to prevent their cutting off the circulation of blood to his hands — Dr. Vincent stands ready.

The rubber-gloved hands of the anesthetist descend over the shaved head. Mme Berthier grasps the metal uprights of the platform. "No, doctor — I"

The anesthetist's needle drops, the plunger slowly penetrates the flesh. Twenty times around that rectangle the needle descends, pricks, infuses its pain-killing drugs.

Now compresses are piled and bound about the glabrous head. Cables lead from various parts of the body to instruments which register respiration, blood pressure, et cetera.

They are ready now to open a door into the brain. The scalp is cut, the flap turned back. Dr. Vincent takes the electric burr offered by an assistant. Holding it strongly to the exposed skull, his hands have the vibratory motion of a steel riveter's. An assistant squirts a warm physiological solution ceaselessly into the incisions. Thus six times — six holes around the rectangle.

Steel wire slipped from hole to hole saws cleanly through bone till the rectangle is free from the rest of the skull, only one small hinge of muscle and skin left to nourish the bony flap during the operation. The door is opened.

Now comes the tedious part. One blood vessel after the other, clustering on the surface of the brain, must be carefully separated, delicately lifted, and tied off. Wound in gauze, they lie packed within the skull.

And now he sees it — the thing he has known would be there, must be there, in that exact spot. There, in the third left frontal convolution it lies, a morbid growth, expanding, pressing, within the bony confines of the skull, upon the yielding brain tissue, displacing it, completely disorganizing its incalculably subtle functioning.

Now the assistants hover. Their many instruments penetrate the soft substance of the brain, lifting, cutting, cauterizing,

staunching, their hands shifting tiny silver wire clips, employing scalpels, scissors, electrical cauterizers. One after the other or several at once, they manipulate the tissue of the brain.

Much blood is lost — a quart and a half. A blood donor sits beside the operating table. Blood passes from her to the patient — a pint, a pint and a half, two pints. The rest is made up by serum injections.

All this time Mme. Berthier is perfectly conscious. Her brain goes on thinking. What does it think of what is happening to it? . . .

It is over. Only the bone door hinged on muscle and skin remains to be swung back into position, and all sewed in place.

They started the operation at nine o'clock in the morning. It is now five o'clock in the afternoon — eight hours. Annette Berthier has been conscious every moment of this time, and under the hands of the surgeon a change has taken place in the quality of that consciousness. Never again will she give the side-long glances of the mentally unbalanced, forget and misuse words, grow violent. The change is almost instantaneous. As soon as Dr. Vincent removes the mask from his face, her eyes seek him out. He comes and stands by her side. She seizes his hand.

"Doctor," she whispers. "Dear doctor, thank you! Thank you for my little ones."

In those eight hours she has returned from what seemed to be a psychosis to complete mental health.

And during this time, Dr. Vincent, without food, without rest, operating every moment, has aged, temporarily, ten years. His face is haggard, his eyes dull, his mouth lax. He has begun to grow a beard. His assistants have all been replaced, but he has not even paused.

His reward is that look in Mme. Berthier's eyes as they follow him to the door.

A brain has been entered to correct something that was wrong with a mind. To this have the researches of Broca finally led us. This, too, he dreamt of.

Such an operation was impossible in his day — before Morton and Long with their anesthetics, before Lister with his antiseptics, before Broca himself with his proofs that cerebral lesions produce mental abnormalities. Today such operations on the brain, and others far more complicated and dangerous, are commonplace.

And yet, as late as 1874 — twenty-eight years after Morton, a decade after Lister — one of the greatest surgeons of his day, Sir John Ericksen, said: "Those portions of the human frame which will ever remain sacred are the abdomen, the chest, and the brain which will be forever shut from the intrusion of the wise and humane surgeon."

Men were considered mad in Broca's day (and sometimes are today) who were no more mad than you or I. And they died, still mad according to the doctors, because the indisputable relation between brain and mind had not yet been established. Even today, when medical science no longer questions this connection, diagnosis sometimes errs, and a man or woman with some damage to the brain is pronounced incurably insane when such an operation as we have just witnessed would restore complete mental soundness.

Perhaps, at this point, it wouldn't be a bad idea to get some notion of what this widely publicized brain of ours actually looks like.

You have a general idea. You have seen calves' brains. Over the mass of white substance which makes up the greater part of the brain lies a soft gray coating (the cerebral cortex) from one twelfth to one eighth of an inch thick. In this gray matter are embedded an incalculable number of tiny cells of all sizes and shapes, intricately connected by nerve fibers. It is folded and folded upon itself as gray velvet may be folded, the main folds being lobes, the smaller folds convolutions.

Right here we come upon another instance of the brilliance of Broca's researches. In his day the most advanced scientists, who scoffed at the phrenologists, nevertheless considered these folds in the brain of no significance. They were merely accidental pleats the brain had fallen into — like the folds of a

lady's dress. The fact that they seldom changed their form and were analogous in all human brains should have warned the scientists that there was nothing accidental about them.

Broca was the first to announce the nature of these folds. He said that it did not matter in the least how far a lesion might be from a certain fixed point in the brain (the researchers of his day were forever minutely measuring how many centimeters from the fissure of Rolando or the fissure of Sylvius or the great longitudinal fissure an injury was) but what did matter was in which pleat the injury lay; for each convolution, he maintained, was the seat of a certain faculty. The fissures and lines about which they made such a fuss were merely arbitrary boundaries of their own drawing, he declared. It is the *pleats* that are important.

The brain itself, consisting of a frontal main part (the cerebrum) and a hinder small part (the cerebellum), is housed in the skull, but its ramifications, the nervous system, extend to all parts of the body. This nervous system is our one and only means of contact with the outside world and the inside world of our bodies.

But this central nervous system does much more than hook us up with these two worlds. It does what I'm sure you'll agree is the most important thing that takes place anywhere in the universe: it makes you know that you are *you*, and alive, and here. It connects up all your diverse parts and makes a unit of you.

You are made up of billions of cells, each one a complete entity in itself, just as much as is an ameba, each cell living its own life, individually feeding, breathing, and carrying on its manifold activities, yet all, since the day of the sponge, relinquishing their individual rights for the good of the whole. All these billions of separate lives in you (which can actually go on living if they are cut off from you) are integrated by the nervous system. In the brain, where integration reaches its climax, is seated mind, which makes known to us this unity so that we feel ourselves an entity, an *I*.

Now to get on with the discovery of these highly prized minds

of ours — which more and more, as we proceed, are seen to be a function of the brain.

Following Broca, as Pizarro and Balboa and Cortes followed Columbus, other explorers of the mind set forth, doctors and surgeons and laboratory researchers. They discovered and mapped numerous areas in the brain, not related to “bumps” on the skull as that once respected and honored breed of scientists, the phrenologists, had announced, but areas in the *convolutions* of the gray matter, each of which had a special function.

There were so many “firsts” in this exciting new adventure of discovering the mind!

There was the first time, no longer ago than 1870, that electrical stimulation was applied to certain parts of the brain of a dog, and it was found that, applied to one area, this electrical stimulation would move a leg, applied to another an eye, to another an ear — the left or right leg or eye or ear as the experimenter chose.

Then there was the first time the method of extirpation was employed, and it was discovered that the removal of a certain portion of the brain destroyed a certain sense or function.

And the first time the brains of living animals (dogs, again) were studied by the clever experiments of Pavlov, and the “conditioned reflex” was launched as a new method of studying the mechanics of the brain.

But the most fertile method of all has remained the procedure adopted by Broca, that of correlating mental disorders with physical injuries, and particularly disorders of *speech*. Ever since that day when he said, “If I can find where speech comes from . . .” the brain has been yielding up its million-year-old secrets, not to the philosophers and metaphysicians, not primarily even to the psychologists, but to the physicians and surgeons. And what, by these new anatomical and physiological methods of theirs, have they discovered about mind? Let us consider a few more cases of speech disorders.

Some years ago a man went to a doctor in Roosevelt Hospital, the eminent Dr. W. Hanna Thomson. A queer case, Ogilvey’s

(we'll call him that). He couldn't speak a word, which wasn't so queer in itself — Thomson had had many such cases. But this time he had a theory — and what is better, he thought he had a cure.

Dr. Thomson gave Ogilvey a prescription for iodide of potassium, told him how to take it, told him to come back in two weeks.

In two weeks Ogilvey came back — beaming.

"See," he said, stammered, and had the deuce of a time going on. "Feeling . . . talking . . . working!" he finally brought out. And beamed some more.

"Finel!" said Thomson, beaming too. "That's just what I expected. Now you go right on taking that iodide of potassium, so many grains, so many times a day, and come back again in — in a week. You'll have some more words then — see if you don't."

In a week Ogilvey was back — with more words.

"I can talk," he said, beaming broader than ever. "I can say —" Here he started stammering. "I feel — you are helping me . . . we are doing —" But when he tried to go on, the words wouldn't come.

Still Dr. Thomson was pleased as Punch. Patted Ogilvey on the back. Go on with the iodide of potassium. More words would come. Come back in a week. And so it went. Each week Ogilvey returned with more words.

And what had the iodide of potassium to do with it? . . . Dr. Thomson had diagnosed a syphilitic gumma, a tumor-like swelling in Ogilvey's speech areas — the third left frontal convolution. The iodide of potassium, as is its nature, was attracted to this tumor and caused it to be gradually absorbed, thus releasing the mechanisms of speech. You see how, the more we study this faculty of speech, the more clearly it shows the dependence of the mind on the brain and the way mind works?

But now if such a case as this of Ogilvey's appears amazing to us, what will we say to the further discoveries concerning the nature of mind made by the doctors who, following Broca's lead, investigated even more curious cases of loss of speech?

It was very curious. Really, come to think of it, it was extraordinary. All these cases of speech disturbances occurred to people who were injured, or diseased, in the *left* frontal lobe. Now that *was* a queer thing. For, argued the doctors, just as many people must be injured on the right side of the head as on the left. Well then . . . ? Well then, why weren't there just as many cases of people becoming word-dumb or word-deaf or word-blind through injuries to the right side of the head as to the left?

You had two eyes — they both worked alike. One eye could, in an emergency, do the work of both. You had two ears — both worked alike. Two nostrils — they worked alike. Besides, the anatomical seats of all the senses and those of muscular movements are located in both hemispheres of the brain. So of course these two identical hemispheres, which function alike for the senses, must also function alike for speech. That being so . . .

What made the whole affair really uncanny was that sometimes — very rarely, just often enough to make the whole thing utterly weird — an injury to the right hemisphere *did* result in loss of speech. So that proved, don't you see, that the right and left hemispheres, like the right and left eyes, were identical in functions as well as in anatomy and physiology since they *could* function alike.

And then, as more and more cases came under observation, a few bold medicos began asking themselves a perfectly ridiculous question.

In a medical journal, at a medical conference, from a fellow practitioner, these doctors would get such reports as this: —

"Partial paralysis with motor aphasia . . . autopsy showed cerebral hemorrhage in *right* frontal lobe." Then perhaps there'd be a last-minute, hasty scrawl, "This patient was left-handed" — as though the doctor himself thought it a matter of small consequence. Which he did.

Or: "Case of auditory aphasia — result of accident — splinter in *right* frontal lobe." And again that casual, all-but-omitted remark, "Patient left-handed."

Or: "Case of visual aphasia . . . tumor in right frontal lobe . . . patient left-handed."

Injury to right frontal lobe — aphasia — patient left-handed. *Always* left-handed. *Always* — when an injury on the *right* side of the brain resulted in loss of speech. But *never* when the victim was right-handed. When he was *right*-handed, as the great majority of people are, the injury causing loss of speech was always on the *left* side of the brain.

At last they were ready to question what they *knew*, what had been *proved*, what their own eyes had seen, what was to them axiomatic. They were ready to question that the two hemispheres of the brain functioned exactly alike.

The thing had gone beyond mere coincidence. The whole matter began to lose its accidental air and to look very much like a law.

It *was* a law.

The law was this: —

The vast majority of people are right-handed. In *all* right-handed people the left hemisphere of the brain is far more highly developed than the right hemisphere. In *all* left-handed people it is the right hemisphere which is dominant. The speech centers, Broca's area and the others, are located in the left hemisphere of right-handed people and vice versa. The two hemispheres of the brain, which *look* identically alike, even under the microscope, *function* differently in right- and in left-handed persons.

Where does this lead us?

To the most amazing conclusions: —

First — that the speech centers bear a very close and definite relation to the hand. (One might expect that from the way speech came — through the hand.)

Second — that the speech centers may be in either hemisphere, but are never in *both*.

Third — that they are in *neither* hemisphere at birth.

Fourth — that therefore each of us *makes* his own speech centers, and develops them in the *opposite* hemisphere to the most-used hand.

We are born speechless. Nowhere in the brain is there anything that will ever make us speak *without instruction*. Speech has to be educated into the brain. The amount and kind of thinking we are to do all our lives depends largely upon how much we can develop our speech centers.

At birth — not a word. But the child begins to hear words, to make sounds, to grasp things. Almost always, whether from long habit of the race, from heredity, from training, from imitation, it uses its right hand most. When it is once determined which is to be the most-used hand, at that moment it is determined whether the speech centers shall be in the right- or the left-hand side of his brain. Either side *can* be used, either side is equally good, both being anatomically identical, but actually only one side is used for speech. The other side, under normal conditions, remains wordless for life — wordless in every implication of the term. Word-deaf because there are no word sounds in the right superior temporal convolution of a right-handed person; word-blind because there are no word images in his right angular gyrus; word-dumb because there is no mechanism for the uttering of words in what corresponds to Broca's area.

So that a man who is deaf to no other sounds, blind to no other sights, and still able to utter sounds, may become deaf, blind, and dumb as far as words are concerned if the *dominant* hemisphere of his brain is injured, but not if the non-dominant one is injured. He has not lost his sense perceptions, but only his educated-in knowledge of words.

Now before we learned all this, it was only natural to suppose, wasn't it, that we thought and spoke with our whole brain.

But no! We can lose *one half* of our brain without losing a single idea. We can still read, write, speak; we can still reason, love, hate, judge, will, as well as ever. Our personality will not deteriorate, nor our morals, nor our intellect — if we retain that one dominant hemisphere.

There are many cases on record where one half of the brain, one of those two perfectly matched hemispheres, has been removed by an operation, and the patient has retained *all* his

faculties. But if the dominant hemisphere, containing Broca's area, is completely destroyed, then the individual indeed sinks low intellectually, emotionally, and morally. Nothing in man is more astonishing than this dominance of one of the two hemispheres, anatomically alike in every respect.

And still we are only at the beginning of the revelations concerning mind opened up by these investigations into speech disorders.

Take the case of Mark Brearley. Brearley was an artist. One day he had a stroke. When he had recovered sufficiently to get around a bit, he went, leaning on his wife's arm, into his studio to have a look at the picture he had been working on before his attack. She removed the cloth hanging over the easel and Brearley saw his painting, a winter landscape. He looked, pressed his hand over his eyes, looked again, turned to her dazed.

"That's not my picture!" he said. "I never saw that thing before! What is it? A wallpaper? A child's daub? It doesn't make sense."

Suddenly he wheeled to where hung a copy of the "Mona Lisa."

"Why have you taken down my da Vinci?" he asked. "And what's that thing hanging in its place?" And then in a lower voice, "Have I gone mad?"

No, he hadn't gone mad. He could still speak, read, write, understand the speech of others, think. The strange thing that had happened in his case was that an apoplectic clot had attacked the recognition centers of his brain, and that particular part of them which knew about the one thing in the world he needed and cared to know about — art. He could no longer recognize pictures — though he could *see* them and could recognize other objects and people; he could no longer distinguish one picture from another, the good from the bad, his own from Michelangelo's. They were all daubs to him.

In the same manner a musician, while he can still *hear* music, may, if a clot forms in exactly the right spot, lose all musical knowledge and appreciation, or he may become

"note"-blind instead of word-blind. An accountant may lose all recognition or understanding of figures. A business man, retaining all his other faculties, being able to read and talk, may be unable so much as to sign his own name.

What a long way in the knowledge of mind we have come since Broca first questioned the dead brain of Tan! Some even suspect, though it is far from proved, that there are separate shelves, not only for each language, as Handover's case indicated, but for musical notes, for the strokes of a paintbrush, for figures, for every sort of object and symbol. In the visual areas is a place which, if damaged, renders the victim unable to recognize faces, even those of his own family, although he clearly *sees* them.

To *perceive* things and to *know* them are not the same. To perceive is congenital. To know is acquired. We may, as infants, perceive things before we recognize them; and we may, like Handover, like Brearley, go on perceiving things long after we have ceased to recognize them.

These knowing centers of the brain are, as Broca suspected, in the near neighborhood of the speech centers — and they are in only *one* hemisphere. The faculties that combine with speech to produce pure thinking are all located in that one *educated* half of our brains.

Both hemispheres are identical at birth. Both are equally impressionable and educatable. One we labor to improve. The other remains for life uneducated and subordinate. Both hemispheres of the brain perceive. Only one *knows, speaks, thinks*. That *knowing* we lay down in our brains entirely by our own efforts, chiefly our efforts at laying down words. All of it, a whole life's work, may be wiped out in a split second by a hemorrhage in the dominant lobe.

In the education which man so painfully gives to one hemisphere of his brain (why only *one* is not known, unless it be the incorrigible laziness of the creature) lies the whole difference between man and the ape — between one man and another.

Today we have what Broca surmised we should one day have and envied us — excellent maps of the brain locating its various motor and sensory functions, and locating them so exactly

that the brain surgeon, by applying an electrical stimulation to successive areas, can move one finger, one muscle, at a time just as though he were pulling the strings of a puppet. The problems of the functions of the frontal lobes, those great silent areas in which are found none of the centers for the lower motor and sensory functions, are still not solved but they are generally believed to be the seat of the higher faculties, of memory, reason, judgment, conscience. In these great association areas (see the drawing of Shakespeare) takes place that synthesis of all the activities of the brain that results in thought and action.

There could be no real science of psychiatry until this groundwork on the brain had been done. Psychiatry does not pretend to study a disembodied soul. It studies mind as a manifestation of matter.

It states, as its major premise, that there are not two things, body and mind, but only *one* thing, the body-mind; and that you can't look at that one thing in two ways: as a mind without a body and as a body without a mind. The two are so inseparable that it is impossible to say where body ends and mind begins.

So you can see that psychiatry, which is predicated on the oneness of body and mind, couldn't possibly have gotten started until Bell, Darwin, Huxley, and, most of all, Broca had done their work. The major concerns of psychiatry — what mind is, how it works, how it becomes diseased, how it can be cured, how it can be prevented from becoming ill — couldn't possibly be solved until we began to ask them of the body-mind.

We had to recognize that curing sick minds is not a question of ethics or even of psychology but primarily a question of medicine.

We had to recognize that we needed a new science, a physiology-psychology, to deal with this body-mind. . . . And that new science, when it came, was psychiatry.

As the battlefield was the birthplace of surgery, so it was the birthplace of psychiatry. As wars with their mutilated bodies gave surgery its great opportunities, so wars with their mutilated minds gave psychiatry its great opportunities.

Let us visit a hospital back of the lines in 1914.

## *The Gentleman in the Lilac Robe*

BYRON WALTHERS was in Paris with the A. P. on August 4, 1914, and from that day on he attended every really worthwhile battle he could reach afoot or on bicycle, by taxicab or in a *quarante hommes huit chevaux*.

Then one day, during an air raid, he was buried beneath the debris of a bombed house. Excavated by the local peasantry, he was found to be without serious injury, but when he tried to rise he discovered that he couldn't move his right arm.

In hospital the doctors could find nothing wrong. It looked an amazingly sound arm to them. Had Walthers been in the army, he would doubtless have been written down a malingerer and perhaps (it was done in those days) have been scheduled for a certain ceremony which usually takes place at dawn with a stone wall for a backdrop.

As it was, they were about to tell him he'd have to move on when a newly arrived American doctor read over his case history and asked to have a look at him. The harassed surgeons and doctors were trying to be polite to this young, pink-cheeked newcomer — a psychiatrist he called himself — but it was pretty clear that they thought that he, too, was taking up valuable space. A psychiatrist, of all things, and at the front!

But that afternoon, after a session with Pink Cheeks, Walthers, who hadn't been able to dress himself unassisted since his accident, was out playing ball.

"Faking, eh?" said one of the doctors, stopping Pink Cheeks in the hall.

"Not at all. Psychoneurosis."

"Never heard of it."

"You will. There'll be plenty of these cases in this show. Hysterical blindness, deafness, paralysis, mutism — queer cases you can't do anything with. Turn them over to me."

"Oh, absolutely. Anything that will cure paralysis in one easy lesson — By the way, what actually did you do to Walthers?"

"I hypnotized him."

"That old gag?"

"Why not? It's a good short cut. I could have used psychoanalysis but —"

"Psycho — ? Never mind. You hypnotized him and then what?"

"Oh, I asked him a few questions, mostly about his childhood. These things usually go back to that time. He remembered a day when, as a little shaver, he crashed into a tree on his bobsled, struck his right arm, and fainted. His mother made him wear his injured arm in a sling and pretty well convinced him it would always be weaker than the other. Several times after that, at critical moments, it let him down — times when it suited him to have it go back on him since it served as an excuse for failure.

"That's really the case now. Subconsciously he'd like to be out of this show, but he can't admit he's afraid, even to himself. So when his arm was lightly struck by a piece of shell, that was his chance. His subconscious mind convinced him it was paralyzed, and to all intents and purposes, it *was*. He *couldn't* move it."

"Sounds rather plausible. So then?"

"So then I explain all this to him —"

"Under hypnosis?"

"Under hypnosis. And I suggest that when I wake him he'll be thirsty, will go to the water cooler and draw himself a glass of water. Which is exactly what he did."

"Using his right arm?"

"Using his right arm."

"Bet that took a fall out of him."

"Starts yelling like a calliope. 'Look, Doc, it's okay! It's not paralyzed any more. I can use it — see!' Starts sparring at me, just to show me."

"That's all there was to it?"

"That's all there was to it."

"Say, I've got a case, chap been here three weeks, going around on crutches, not a scratch on him, never even been near the front. Maybe —"

"Let's have a look at him."

Thus were the first cases of "shell shock" made known to the world — and to the doctors, who understood as little about these "psychoneuroses" as the rest of us. Very queer, almost incredible did these tales of men who were blind, deaf, crippled without any organic injury, filtering to us through the press, sound to us a few decades ago. Queerer and more incredible did the cures worked by the psychiatrists appear.

Psychiatry, conceived in the insane asylum, was delivered on the battlefields of World War I. For the first time, after a brief rehearsal during the Russo-Japanese War, psychiatrists were sent to the front to see what, if anything, they could do for those "queer cases" of whom the rank-and-file doctors and surgeons washed their hands. Blind men with perfectly good optic nerves. Deaf men who'd never heard a gun fired. Lame men who'd never been wounded. And they found they could cure these baffling cases and send them back to the trenches sound in wind and limb with no treatment except talk. Just talk.

For the first time the psychiatrist felt that he was of some use outside an asylum or a police court, that he alone could cure these strange cases of shell shock, and that, where orthodox medicine and surgery failed, he, the "nut-doctor," could brilliantly succeed. Under the hail of bomb and shell, psychiatry came of age.

Psychiatry is not a "pure" science. It is a strange mingling of many sciences, with physiology and psychology predominating. Psychiatry studies and treats mind and body as an entity, using both psychology and medicine. The psychiatrist is first

and foremost a doctor, a graduate of a medical college, which most psychologists have never attended, and his work is the treatment, and if possible the cure, of the sick mind. With this the psychologist has no concern.

Although psychiatry, by definition, includes both methods of approach to the sick mind, the psychological and the physiological, yet every psychiatrist leans, even if ever so slightly, to one side or the other. Thus a certain antagonism exists which has its roots deep in the past. There grew up between the two camps in the centuries preceding the merger, and continuing unabated today when theoretically they are happily united, a bitter warfare. Let us glance over some of its earlier engagements.

We have seen how, in modern times, the physiological approach got started with Broca and how, in one field, surgery, it culminated in such operations on the brain as that of Dr. Vincent. Now how did the psychological approach, starting as black magic, develop into the modern science of psychotherapy with such miracles as the cure of shell shock in World War I to its credit?

We must go back to the days of our own American Revolution. From an admirer in France the leader of the Revolution one day received a letter.

"Sir," wrote Lafayette to George Washington, "a certain doctor here has made the greatest possible discovery and has taken a few pupils, among whom I, your humble servant, am one of the most enthusiastic. Before leaving for America I shall obtain his permission to reveal to you this secret which is a philosophical discovery of the first magnitude."

This certain doctor?

Let us visit him in his house in the Place Vendôme in Paris. We enter what was once the salon of this mansion, now the clinic of the Gentleman in the Lilac Robe. It is an astonishing apartment, half elegant Parisian ballroom, half church, nothing at all of a doctor's office. Colored light pours through stained-glass windows, the signs of the zodiac swim in misty space above our heads, deep carpets soften our footfalls, organ

music fills our ears and incense our nostrils. Comely and beautifully dressed male attendants receive us.

There is only one false note in all this elegance. In the middle of the room stands a covered wooden tub filled with water from the top of which protrude a number of iron rods. This homely *baquet* is the shrine of the notable and fashionable Parisians who daily throng the apartment.

The patients begin to arrive. It is more like a reception than a consultation. In fact, there is no consultation. The doctor himself is not even present.

The patients seat themselves about the *baquet*. It is forbidden to speak, even to move about. Each takes one of the iron rods and presses it to the affected part of his or her body. Thus in tense and expectant silence they wait for half an hour, an hour.

A bell rings. The patients join hands, forming a chain. To swelling music, the doors are flung open and the Gentleman in the Lilac Robe enters.

He would be, anywhere, an impressive figure. It is said that when he walks through the streets of Paris with his good friend Gluck, the composer, equally handsome, all heads turn after them. Entering as he does now, with his air of being a procession, wearing his magnificent lilac robe and bearing a wand, he is one of the most imposing presences imaginable. In any other man that air of assurance would be insolence, but in him it is so natural that even kings find it acceptable. His eyes alone, with something strangely penetrating and compelling about them, would dash the curl of skepticism from the cynic's lips.

The power he now brings to bear on these men and women with their many assorted ills is certainly not lessened by his personality, compounded of overwhelming energy and an invincible will. He, however, ascribes his cures to something quite different.

He walks quietly among his patients, touching this one with his wand, speaking a few words to that one, fixing a dominating glance upon a third, weaving with his hands a maze of little gestures about still another, until in each he has produced the desired effect. One by one they begin to tremble, to laugh,

to groan, to dance, to embrace, until they reach the final stage, the convulsions or the stupor or the hysteria which proves that they have received the full measure of the healing force.

Then, quietly and with dignity, the doctor passes among the convulsing or stuporous forms, saying to one, "*Dormez*," to another, "*Eveillez*," ordering the more violent patients carried into the adjoining padded rooms, until at last the salon is restored once more to its former polite amenities. And in one or more such treatments these people, most of them, will be cured of whatever ills have brought them here.

This, ladies and gentlemen, is the famous Dr. Franz Anton Mesmer, and the power he exerts is, according to him, "animal magnetism," or, as his followers later called it, "mesmerism." That *baquet* is magnetized, the iron rods are magnetized, the water is magnetized, his wand, his clothes, are magnetized, he himself emanates the healing fluid. "Magnetism" is in his hands, his words, the glance of his eye. So, at least, he and his patients believe.

Now how did all this start?

Before coming to Paris, Mesmer was a physician in Vienna, married to a woman of considerable wealth, living on a handsome estate, entertaining lavishly. He was never a very busy doctor; by preference a dilettante in music, but always a studious and serious man of that profound respectability which his countrymen, the Swiss, so heartily approve.

Until one day he "discovered" the therapeutic value of magnets. Having conceived (or rather revived) the idea that magnets have a healing property, he decided to test this notion by laying magnets upon a patient in a manner calculated to draw off the pain or disease. The very first time he attempted this he was successful. Thereafter his cures mounted until he was the sensation of the city and the scandal of the profession.

Let us take one of his cases.

There lived at that time in Vienna a young, blind pianist, Maria Theresa Paradis, the namesake and protégé of the Empress of Austria, whose concert performances were brilliantly

attended and whose musical compositions are still preserved in the Vienna Library.

At the time she was recommended to Dr. Mesmer by a mutual friend, young Mozart (who bore witness to the doctor's amazing cures), Maria Theresa was eighteen and the victim not only of the total blindness which had come upon her at the age of four, but of a whole catalogue of symptoms. All her life she had been the patient of some of the most notable physicians of the day, including von Storer, the Empress's own doctor, who had treated her unsuccessfully for ten years.

Now Mesmer began to treat the young girl by his new method. Maria Theresa readily responded with the expected convulsions and Mesmer was sanguine of a successful outcome.

One day, waving his hands before her face to test whether her blindness was lifting, Mesmer was startled to hear her say in a scornful tone (say to the magnificent Mesmer!), "Can *this* be a man?"

He glanced quickly behind him and then back to his patient.

"Ah," he said, smiling, "so you see me, Maria Theresa? And am I so very displeasing? Well, perhaps you'll like this fellow better." And he called to his side his great dog, lying on the hearthrug.

"Yes," nodded the girl seriously, "the dog is far more agreeable to look at."

From that day on, her cure was rapid. Her father has recorded its stages in a little diary which has come down to us with such convincing details as no novelist, however gifted, could have invented.

When she walks in the garden it seems to Maria Theresa that the rosebushes march along with her, the trees a thousand feet away across the Danube look close enough to touch, the lighted house at night appears to be coming to meet her, the stars overwhelm her and she sinks reverently to her knees.

Pirouetting before a mirror, she is amazed and amused at her changing sizes and shapes. The bit of meat on the end of her fork looks ludicrously small until it reaches her mouth, when

she is sure it is too large to go in. Eyes and mouths are queer enough, but noses! — noses are simply incredible. They seem to threaten her, as though they would pluck out her eyes. . . . There is no doubt that Maria Theresa is seeing the world for the first time within her memory.

And then the debacle.

This man Mesmer is becoming a thorn in the side of the medical profession. To him are flocking the sick of the city, and particularly the wealthy and fashionable sick. He is making an immense reputation for himself and one, these gentlemen contend, which is founded on pure buncombe. Yes, they have seen his "cures." Yes, their own patients have gone to him and come away seemingly well. Still the fellow must be put a stop to. Why? Because the whole thing was against science and sense. Magnets *could* not cure. There was no power in them to cure so much as a toe ache. This so-called "animal magnetism" was sheer hokum. . . . How then were the cures effected?

There were any number of answers to that, glib on the tongues of the doctors. In the first place, there was no proof that the so-called cures *were* cures, certainly none that were more than temporary. All that was proved was that the patients *believed* they were cured. Once their faith faltered, they would be right back where they started. As for the Paradis girl, well, she might have been cleverly trained to deceive her examiners — or she might have recovered spontaneously — or Mesmer had used something besides animal magnetism — or she had never really been blind.

The outraged medicos went into a huddle and finally they hit upon a scheme. Mesmer himself innocently gave them the cue. He announced (the cheek of the fellow!) that he was taking Maria Theresa to the Empress to prove to her that her protégé was cured. . . . A deputation of doctors waited upon the Paradises, *père et mère*, and the upshot of the conclave was the scene which, Mesmer said, to the end of his life he could never recall without an irresistible repugnance for human nature. The Paradises invaded Mesmer's house, demanded the return of their daughter, dragged her from her room, and, on

her refusal to leave, flung her with some violence against the wall. Swords were drawn, the household was in an uproar, and in the end Maria Theresa, going from convulsion to convulsion, fell once more into total blindness.

The reason? What the deputation had whispered to the Paradieses was that, once the Empress found that her namesake had recovered her sight, she would undoubtedly withdraw the pension on which the family lived, and that moreover Maria Theresa, her sight restored, would no longer be the drawing card at concerts she had formerly been.

In the end Mesmer prevailed upon the parents to leave their daughter with him for another course of treatments and he had actually restored her sight for the second time when the doctors played their trump card. Look! the girl, after her first cure, had become blind again. Did that not prove that she had never really been cured? That her temporary remission was "a delusion, based upon imagination"? And that the whole theory of animal magnetism was therefore a hoax?

A commission was appointed and Mesmer was duly investigated. Naturally the commission found for the profession and a certain Dr. Ost was accorded the honor and pleasure of waiting upon Mesmer and announcing its verdict. He handed Mesmer a formal letter from von Stoerck, Chairman of the Commission, ordering him to "make an end of this fraudulent practice," expelling him from the medical faculty, and giving him the choice of ceasing to practise medicine or of leaving Vienna.

He left Vienna. He went to Paris. And there he became the legendary Mesmer of whom we have all heard, the greatest medical sensation who ever set that city by the ears, whose séances were attended by Marie Antoinette herself, by Mme. de Lamballe, Mme. du Barry, Montesquieu, the Prince de Condé, the Duc de Bourbon, Lafayette, Benjamin Franklin, and so on. We have seen how, to meet the demands made upon him, he arranged to give mass treatments by creating an atmosphere which would induce the necessary mass hysteria. By such spectacular methods and by his sensational cures he became so great

a wonder that he almost distracted the French from their revolution.

And it all started with a bit of magnetized iron. How from this did Mesmer go on to the theory of animal magnetism?

In the earliest days of his experiments he was astonished by the ease with which he cured the most intractable illnesses. In fact his magnets cured so many kinds of sickness that he began to be suspicious of them. If there is one thing a doctor knows, it is that there is no universal panacea. Nor is cure any proof that the origin of the disease has been reached and the correct treatment applied. Unless you know just how a remedy works, far from being a scientist, you're no better than a miracle worker — and no self-respecting doctor cares to be ranked with the local shrine.

So when Mesmer saw that these magnets of his were going to cure practically everything, he began to be suspicious. To the best of his ability, in a day that was grossly ignorant of physiology and anatomy, did little or no research work, and performed practically no operations, he endeavored to solve this medical enigma.

The way to do that in his day was to dig into Hippocrates and Galen and to apply the precepts of these ancients, who were considered to be the depositories of all medical knowledge, to any new data. This was called philosophizing and was held to be very sound procedure indeed. From these sessions Mesmer finally emerged with a theory concerning which Schopenhauer later said, "From the philosophical standpoint, Mesmerism is the most pregnant of all discoveries."

This is how he reasoned: —

Magnetic iron comes to the earth in a meteor. Meteors are cast off from planets. The magnet therefore partakes of the nature of the planets. As the planets have the power of attraction, so does the magnet.

There is a reciprocal influence between this broken-off bit of planet and the parent planet. This influence is almost certainly some such material manifestation as Franklin's recently discovered electricity. Invisible, intangible, undemonstrable

to the senses, but proved to exist by the power it exerts.

The planets provedly influence the earth and the human organism. The tides, the atmosphere, the weather, the periodicity of women, epidemics, lunacy, the crises in sickness, all are examples of this planetary influence. That is why these bits of planet, or other magnets artificially produced, can exert such profound influence over our bodies, and particularly on our nervous systems. Electricity courses through our bodies. In like manner they are filled with this subtle planetary fluid. This fluid in the body reacts to the same fluid emanating from the planets and from the magnet.

Now this was good philosophy in Mesmer's day. That philosophy is not good medicine was not his fault.

Having achieved this philosophical *tour de force*, Mesmer conceived that he need have no further scruples about curing people. Science had given its blessing.

So, with a clear conscience, he went ahead and was curing all sorts of people of all sorts of sicknesses when the most disconcerting thing occurred. To his amazement he discovered that he could cure people just as well *without* magnets as with them! He could cure them with any old bit of metal, any old stone or piece of glass, with paper, leather, bread, water — anything!

This was highly unorthodox and disturbing. Again his whole magnificent discovery began to take on an aspect of black magic and he saw himself being classified as a witch doctor, one who cures with amulets and charms. So he retired once more to his study and delved further into his ancient philosophers and physicians.

"It must be that not only iron, but other materials can be impregnated with this magnetic force," he now reasoned. "Evidently, as I go about touching things, I transfer this fluid from one object to another. So everything I touch becomes a medium for the transference of this healing force."

For a while again his doctor's conscience was at rest. He could go ahead and cure people in the full conviction that he was practising orthodox medicine.

And then all of a sudden he discovered that he didn't even need a magnetized object at all. His hands *alone* conveyed the planetary fluid. He need only *touch* these people — and they were cured!

That was a poser.

Trying to solve that one, he came at last to the high moment of his philosophizing. He conceived his theory of "animal magnetism." Magnets were entirely unnecessary. *He* was a repository of the planetary fluid which passed directly from him to his patients. This fluid was an actual, material force. His cures were not achieved, as these envious Viennese doctors were beginning to say, through credulity on the part of his patients and undue mental influence on his, but through an actual physical medium. Imagination, the stigma they were trying to fasten upon him, had nothing whatever to do with it.

He was as close as that to one of the greatest discoveries of modern medicine — and he couldn't take the final step. He never took it. Even when he found he need not even *touch* his patients, approach them, look at them, but could produce the desired effect merely by his presence, he still could not take that final step. To the end he clung to the theory of a planetary fluid, never once guessing at the true nature of the power he exerted.

There was one other thing that troubled Mesmer, and that was his failures — for Mesmer had his failures. How *could* he fail, he asked himself, when the healing fluid passed through him to a patient? But finally he worked that out, too.

It must be, he argued, that certain patients resisted this influence. The patient must sincerely desire to be well, must have confidence in his physician, and co-operate with him, or he would get no benefit from the treatments. To this sympathetic bond, this mutual understanding between patient and physician, he gave the name *rapport*.

How, we ask ourselves with our brilliant hindsight, could he *now* fail to divine the true explanation? In that idea of *rapport* he anticipated the Freudians by over a hundred years and had he now been able to admit a psychological explanation

for his method, he would have placed himself among the great-est physicians of his own or any day.

He need only have thrown that ridiculous notion of a planetary influence overboard and have said, "There's no such thing as animal magnetism, no planetary fluid that passes through my body into the bodies of my patients. I convey to them, not a physical, but a *mental* influence, and it is that *suggestion* which cures."

Then his theory would have been as sound as his practice for then he would have been describing *exactly what did happen*.

Now how is it that a man who didn't understand what he was doing could do it with such astounding success, not once, by accident, but continuously, for forty years?

Half of the answer is the man himself. He *knew* that he had discovered one of the great laws of nature, comparable to Newton's discovery of gravity (fancy doubting gravity!), and that he had only to apply this law to produce cures. *He* knew he could cure, his patients knew he could cure — and the two between them produced the miracle.

The other half of the answer is the kind of patients he treated. You have seen them and you have recognized that their ailments were what are today called "psychoneuroses," "hysterical disorders," the shell shock of World War I. Mesmer knew that this treatment of his was only for such cases, and it was only such nervous disorders that he undertook to cure. The planetary fluid affected chiefly the nervous system and so had no value for, say, tuberculosis. These nervous disorders are today, and were in Mesmer's day, susceptible of psychological treatment, for they are of psychological origin. Which is not to say they are imaginary.

Mesmer fought all his life against that word "imagination." Psychology in his day was not a science, and any doctor who would have admitted that he was curing people by working on their minds would, by that very fact, have placed himself among the outcasts of medicine, the miracle workers, the priests and saints who cure by faith. Mesmer was *forced* to seek a

physiological explanation for his treatment. Psychology wasn't good enough.

From the very first the doctors had tried to destroy him with that word "imagination." The cure, they insisted, existed only in the mind of the patient. Again and again Mesmer sought to have this stigma removed by an appeal to the important scientific societies of Europe. His final appeal was to the French Academy of Science which appointed an all-star commission to pass judgment upon him. The foremost botanists, chemists, astronomers of their day they were — with never a psychologist among them. But Ben Franklin was there, because he had discovered electricity, and Dr. Guillotin was there for no better reason than that he had advocated the guillotine.

Their verdict?

"Imagination is everything in these phenomena, magnetism nothing."

*That*, they considered, disposed of Dr. Mesmer.

De Jussieu alone, the founder of modern botany, seems to have had an inkling of the truth. He wrote a minority opinion in which he stated that if imagination could work such cures (and none denied them), then it should not be waved aside as "mere imagination," for nothing so potent could be *mere*.

The human body is subject to many sorts of influences [he wrote]. Some of them are external and physical. Others, imagination for instance, are from within and are moral and mental. Some force, which is transferable from one human being to another and which frequently produces a visible effect upon the person to whom it is transmitted, is undoubtedly at the bottom of these cures. What is it? Let us investigate.

But no one thought it worth his while to investigate this trifling psychological phenomenon.

There was also in Paris a doctor, d'Eslon, physician to the King's brother and a student and practitioner of mesmerism, who said: —

I think I can lay it down as a fact that the gentlemen of the Commission are so far right, that it is imagination that plays the

largest part in so-called animal magnetism. It may indeed be *entirely* imagination. And if it is? Then imagination is a force as potent as it is little understood. Let us work with this mysterious imagination, let us use it to cure, let us learn more about it. If it can cure — and it undoubtedly can — is there any reason why we shouldn't use it?

If Mesmer had discovered nothing more than that the imagination can exert a beneficial influence upon health, would he not be one of our greatest physicians? His, I believe, is one of the most important discoveries at which the human mind has ever marvelled.

To Mesmer such praise was scarcely less odious than the condemnation of the Commission. With such psychological vagaries he would have no truck. But Mesmer was wrong and the Commission was wrong and d'Eslon and de Jussieu were right. The psychological explanation which Mesmer so bitterly resented was the correct one. It was the gradual unfolding of this truth down the years that eventually produced the modern science of psychotherapy. As we shall see.

And Mesmer?

A quarter of a century after the Parisian interlude, a German scientist, Professor Wolfart, sent all the way from Berlin by the Berlin Academy of Science, arrived in the little town of Meersburg on Lake Constance, seeking a certain Dr. Mesmer.

"Ah, yes, our good old Dr. Mesmer," the Meersburgers nodded, and pointed out to him a modest house. They had never heard of the famous Franz Anton Mesmer, the sensational Gentleman in the Lilac Robe, the patron of great musicians, the friend of kings, the man who had refused a huge pension from the Emperor to remain in France. They knew only a kindly old man who cured their ills by a strange but marvelously successful method he called animal magnetism. •

To the Berlin Academy their representative, Professor Wolfart, reporting after his interview that Dr. Mesmer refused point-blank to come to Berlin to be made famous all over again, wrote: —

He showed an abundance of knowledge in all branches of science such as do not usually come within the compass of one individual,

together with a kindliness of heart manifested by his whole personality, his words, his actions, and his environment; he showed the most amazing power of influencing his patients by his penetrating glance or by his quiet raising of his hands; and all these qualities were intensified by an aspect calculated to inspire the profoundest veneration.

Such a man, it seems, had he been encouraged instead of condemned by the foremost scientists of his day, might have arrived at a true understanding of the extraordinary new treatment he introduced and so have advanced the birth of psychiatry by a hundred years. Almost a century before Broca discovered a physiological pathway to the mind, Mesmer opened this psychological pathway. As these two pathways widen and converge, we see the science of psychiatry gradually emerge, and finally, on the stage of the Great War, become the science which not only reveals the mind of man but, for the first time, successfully treats its disorders.

After Mesmer? From mesmerism to hypnotism and hypnotism to psychoanalysis may seem, at first glance, not such a long way. But again that is hindsight. Working forward, it was not so simple. In the first place, science would have none of it, wouldn't touch it with a ten-foot pole. Utterly repudiating mesmerism, science cast it to the charlatans, who exploited it for a century.

But here and there was an honest, well-meaning amateur, like Lafayette, who took it up seriously.

First there came a young Frenchman named de Puységur, who sat under "a tree very old, still strong and green" in Buzancy in France. . . .

## VI

### *The Nasty Little Science*

PEASANTS are not Parisians. You can't invite them into your ancestral hall and expect them to knock about among the family heirlooms, loll upon gilt and brocaded chairs and have their convulsions on Aubusson rugs.

So the Marquis Armand Marc Jacques de Chastenet de Puy-ségur, lord of the manor at Buzancy, and, like Lafayette, a pupil of Mesmer's, who had a keen sense of his responsibilities toward the local peasantry, strolled over to the village green where the people daily gathered to gossip, to discuss crops, and, on occasion, to dance and drink, and seated himself beneath that century-old elm of theirs. The peasants would talk freely to anyone under their old tree, even to Monsieur le Marquis.

Mesmer had magnetized a tree in Paris and hundreds had been cured by contact with it. That gave de Puységur his idea. He magnetized the old elm, placed rough benches around it, hung cords from the branches which the peasants, sitting in a circle and holding hands (as around the *baquet*), held to the affected parts of their bodies — and waited.

And, of course, it happened. The crisis over, they felt better, and after several such crises they were cured, by the hundreds — sixty-two in the first two months. From the first this young mesmerist was a great success for, like his teacher, he was kind and patient and simple with simple people.

One spring day, sitting with a patient, Victor Race, de Puy-ségur was astonished to see the lad, instead of going into convulsions or a stupor, fall peacefully asleep in his arms.

"Victor!" cried de Puységur, smiling and shaking him.

"Yes, Monsieur le Marquis," said Victor, without waking. "What is it?"

Startled, de Puységur turned to the mother of the boy, her hands plucking nervously at her apron.

"Speak to him," he ordered her.

"Victor, my boy, what is wrong with you?" she faltered. There was no answer. Others tried. Only de Puységur did he respond.

"Well," said the latter, now thoroughly grave, "since you attend so well to what I say, let me see you stroke your chest where the pain is with this cord." Victor obeyed.

"And now," continued de Puységur, more and more impressed, "when you wake your inflammation of the lungs will be gone. Do you hear me, Victor? You will be well. It is I, de Puységur, who tell you this."

"I'll be well," repeated Victor.

"And now I want you to rise, go to the elm tree and embrace it. As soon as you touch it you will waken."

And that is just what happened.

Then de Puységur questioned the lad concerning what had occurred during his sleep.

"Sleep?" muttered Victor. "When? Who's been asleep?"

He had no recollection whatever of having slept or talked in his sleep. But he was cured of his pains.

This is the first authenticated case of the mesmeric sleep, that sleep in which the patient, unaware of anything except the commands of the mesmerist, carries out his orders during and *after* the trance. We have come one step nearer to modern hypnotism. In Victor Race we have the first clearly documented, uncomplicated case of hypnotism on record.

A much simpler way than the convulsions of Mesmer has been found to cure nervous disorders. But we have still a long way to go.

For de Puységur still held with Mesmer that what passed from him to his patients was a "planetary fluid." No more than Mesmer would he hear of anything so unscientific as psychological

influences. Imagination to him, as to his master, was anathema. Later in life he did admit that the *will* of the mesmerist played a part in this transference of the fluid — but it was still the fluid which was the healing power. To admit the will was, however, a step toward the truth.

A very simple procedure now took the place of the mass hysteria of Mesmer's séances. De Puységur went about among his patients, touching them and saying quietly, "*Dormez! Croyez et veillez!*" (Sleep! Believe and will!) And they were cured.

And now de Puységur, curious concerning this strange sleep which is so different from normal sleep, asks, "Is this really sleep? Or is it a state of mind between sleep and waking — a twilight consciousness, a mental condition never before recognized? Is there perhaps more to mind than consciousness — and then unconsciousness? Many states of mind between the two extremes? And what makes it possible for the subject to hear and respond to one voice — and no other? To forget all that happens during this sleep? To be cured by the words of the mesmerist?"

These were questions never before posed. They opened new approaches to the mind. They were not answered by de Puységur. They were not answered for a hundred years. But they started psychologists thinking.

Then de Puységur made still another discovery — and this turned out to be a very unfortunate discovery indeed, one he would much better not have made.

One day, talking to Victor in his trance state, he remarked that the lad, none too bright in his waking hours, was thinking and talking in a manner far more intelligent than in his waking state. He spoke almost like a doctor, diagnosing the illnesses of those who stood about and prescribing for them. That gave de Puységur an idea. He instructed the villagers to follow this advice and, lo! they got well. Thereafter he used Victor as an intermediary to convey the healing influence, convinced that in his unnatural condition he possessed extraordinary powers. Victor became the first medium on record.

Anything more unscientific than the idea of a medium pos-

sessed of supernatural powers could not well be imagined. Science was revolted. More than ever the medical profession was convinced that mesmerism and all its ways were silly, ignorant, and immoral.

Here is a classical-example of medicine rejecting one of its greatest discoveries and holding up its own progress for decades. The profession refused categorically to admit mesmerism into *materia medica* and flung it scornfully to the layman. It became, in the hands of charlatans and amateurs, a parlor game, a vaudeville trick, a scandal. It bred the whole tribe of somnambulists, clairvoyants, spiritualists, mind readers, faith healers who, with their table rappings, Ouija boards, levitations, ectoplasms, communications from the dead, played on the credulity of the unsophisticated. It did indeed earn the name science gave it. And it was science's own fault. It had tossed an uncut diamond into the gutter.

De Puységur took animal magnetism one step nearer modern hypnotism. Following him, each adding his bit of truth, came: —

Deleuse, who, still clinging to the original fallacy of a fluid, announced that it emanated not from the planets, but from the magnetizer himself and that his *will* was not a minor factor in its transference, but the essential factor.

Barbarin, who discarded the untenable notion of a fluid altogether and stated that it was the will *alone* which produced the therapeutic result. Now at last we are in the realm of pure psychology.

De Faria, who proclaimed that the will of the mesmerist played an unimportant role and that it was the receptive attitude of the patient and the rapport between him and the mesmerist that were the basis of the treatment.

Bertrand, who proved that the power of the mesmerist goes far beyond suggestions concerning the health of the patient and actually controls his thoughts and actions during and after the trance, can cause him to forget whatever the mesmerist wishes, and even prevent his seeing people who are actually present. This "third state of consciousness," he said, offered a fertile field of investigation.

Récamier, who discovered that the somnambulistic sleep could be used to eliminate pain during operations.

Dr. Elliotson and Dr. Esdaile, who performed hundreds of major operations *painlessly* in mesmeric sleep.

Du Potet, who showed that a *waking* trance state could be induced by forcing the subject to stare at a shiny black spot on the floor and that in that state he would visualize scenes and episodes into which he projected himself as though they were reality.

Yet with all this, we still are a long way from modern hypnotism.

Then about 1840 came a chap named Braid, at a time when mesmerism, despite all these men had done to legitimize it, was in its most disreputable phase. Any doctor who so far demeaned himself as to dabble in it could count on being expelled from his hospital and blackballed from his club.

Braid, a hard-headed Scotchman, was the last man in the United Kingdom to take up with fantastical notions. Only such a solid citizen, head of a lying-in hospital in Manchester, could have rescued mesmerism from the state to which it had sunk.

One day Dr. Braid happened to witness a demonstration by a traveling French mesmerist and his skeptical eyes noted two things: first, that the mesmerist stared fixedly at his subjects, and second, that the eyes of the subjects invariably underwent a peculiar spasm just before they dropped off to sleep and that usually they couldn't open them during the trance.

"So," said Braid to himself, "*that's* how it's done, is it?"

And he went home and summoned a friend to his house to assist him in an experiment.

"Now, Walker," said he, pushing the obliging gentleman into a chair, "you just sit there and look at that shiny wine bottle on the top shelf. Don't think of anything — that won't be difficult, old man — but just look at that bottle and keep on looking — and looking — and looking . . ."

Almost immediately Walker was in a first-class mesmeric trance.

"Wife," shouted Braid. "Wife, just step in here for a minute,

will you? Now, woman, sit yourself down in that chair and raise your eyes to that shiny silver sugar-basin of yours. I want you to stare at it hard, and keep on staring — and staring . . . ”

In a few moments Mrs. Braid likewise slept.

“There you are,” said Braid, waking them. “That’s all there is to it — this mysterious influence emanating from the mesmerist, this odic force, this overpowering personality, this basilisk eye, this God-knows-what-all! It’s just staring at a shiny object. What? You don’t understand yet? Why, man, it’s naught but fatigue of the nerve centers of the eyes! You stare at a glittering object until the prolonged sensory strain paralyzes the nervous centers and your attention is narrowed down to that one object. Why, you’re simply the victim of one-ideaism!”

“Look,” he would explain later when he became famous for his cures by mesmerism and his theories had advanced far beyond these early notions. “I don’t do a thing to the patient — no mysterious passes, no fixed and glittering eye, no dominating personality, none of that fancy French stuff. I simply tell him to relax body and mind, think of nothing except rest and sleep, and that in a few moments he will be in a trance. They don’t even need to stare at anything, as I first thought, because this hypnotic trance is not induced by physical measures, not by fatigue of nerve centers, but purely by psychic influences. Why, I’ve mesmerized blind people. This trance state is entirely subjective. I don’t put the patient to sleep — he just *goes* to sleep. It’s simply a matter of suggestion.”

Now when these subjects of his were mesmerized, Braid found, as all the mesmerists had said, that they actually were in a very different mental state from their normal one. He could do a lot of things with them that he couldn’t do when they were awake. They were docile and receptive and he could inject into their minds ideas that somehow — he didn’t know how — cured their illnesses.

He called the attention of the medical profession (who weren’t listening) to this extraordinary docility of the mesmerized. Here, he told them, was a new factor in medicine, the influence of the mind on the bodily condition, “the new im-

ponderable." All that he knew about the whole affair, he admitted, was that he was able to exert some sort of mental influence over people who were in a very suggestible state of mind during mesmeric sleep. . . . Suggestion. That was his first bull's-eye.

Now for the next. Braid noted, as had de Puységur, that a person in trance was not the same individual as that person awake. He was often two quite different people. Braid decided to prove this scientifically.

He got hold of an uneducated laborer, mesmerized him, and proceeded to teach him French. It took some doing but he was really getting somewhere, after a number of sessions, except that, whatever progress the fellow made during trance, he lost on awaking. He forgot every word of the new language, even denied he'd ever heard the lingo. But put him back to sleep and he babbled it off like a native.

So Braid called this phenomenon "double consciousness." His second bull's-eye. Modern psychotherapy stems directly from these two principles, suggestion and double consciousness.

Casting about for a name for this new method, which he quite rightly declared had little in common with mesmerism, trying out words like "neurypnology" and "neurohypnosis," Braid finally hit upon "hypnosis" — and that's what it's been ever since. Hypnosis he defined as "nervous sleep," due to certain changes in the central nervous system. Where now is our planetary fluid?

We should pause here to note two things: —

First, it was not that, before these men appeared, nothing had been scientifically known about the human mind. The old philosophers and psychologists had been very discerning and profound about it — only they had studied consciousness exclusively, never suspecting that by far the larger part of mind lies hidden beneath consciousness. What these new men are doing is to point out that beneath the conscious mind extends, like the submerged part of an iceberg, depth beneath depth of subconscious mind. When once we began to delve into these heretofore unsuspected and inaccessible depths, we developed a

three-dimensional psychology. Depth psychology, it is called.

And second: It was all very well, and quite logical, to study normal mentalities in order to find out what human nature is like, but, quite illogically, it was only when we began to probe the abnormal mind, trying to discover what had gone wrong and how to set it right, that we really learned to understand normal human beings — as we shall see as we go on.

To continue. The medical profession was not impressed by Braid's discoveries. Mesmerism, under whatever name, left them contemptuous. The disparaging shrug placed Braid in a medical limbo.

Then one day the heavy plush atmosphere of the French Academy of Science was ruffled by a new word, never uttered there before — "hypnotism," pronounced by a distinguished surgeon. He had, he said, been reading the works of a certain Scottish physician, James Braid. Not only that, he had been practising this new kind of mesmerism — with the most amazing results. So he had concluded that, just as the knife can lay bare certain mechanisms of the brain, so hypnotism can reveal certain processes of the mind. More, it could cure its ills.

The distinguished surgeon? Broca.

When Broca spoke, Academicians listened. The meeting broke up in indecorous uproar. "Hypnotism" was, for the first time, mentioned above a whisper in conservative medical circles. Wonderful chap, Broca. Amazing idea, hypnotism. Great old boy, Braid. Perhaps, after all, there was something to it. Curing the body by influencing the mind, eh? Might be worth trying. Must read Braid's works. One day something might come of it.

But nothing much did come of it until —

It was in the little town of Nancy. A country doctor who made a point of keeping up with big-town affairs read a report of Broca's lecture and really did get hold of Braid's books and read them. Not only that, he sat right down and began to practise what he read.

It worked as well for him as it had for Mesmer and for Braid. He thought, after he'd been at it for some time, that here was something the doctors of Paris might like to know

about and he wrote a little book about his cases and his methods (somewhat different from Braid's) and someone bought a copy. And that was that.

But this Dr. Liébeault, tucked away in the obscurity of his small-town practice, went right on curing his patients by Braid's hypnotism with variations. He rediscovered the suggestibility of the hypnotized. All that was necessary, he found, was to sidetrack the attention of the patient. You concentrate his attention on one thing, thus bringing about the isolation of his senses, the cessation of muscular movement, and the rapport between the somnambulist and the hypnotizer. Then you slip in your suggestions for the improvement of his health, and there you are!

One day a knock comes at Liébeault's door and a Dr. Bernheim, also of Nancy, introduces himself.

"About that sciatica case of mine," he begins. "I'd been treating the fellow for months with no results. He comes to you, you give him a few hypnotic treatments, and he's cured. I figured that if you could do in a few days what I couldn't do in six months, this hypnotism of yours is something I should know about."

Liébeault flings wide his door.

"Come right in," he says. "I've been waiting for almost twenty years for one of you young doctors to show up." Leading him to a little room off the garden, he continues, "As usual my other office is crowded, so we'll go in here. Really, it was scarcely worth your while to come. I could have written you directions. It's all so simple. . . . This is Madame Ribot, Dr. Bernheim. Look, I'll show you how it's done. Madame's right arm is anesthetic, completely without sensation. She eats and sleeps poorly. We're going to change all that."

He sits opposite his patient, looks steadily into her eyes, begins speaking in a low, monotonous voice.

"Go to sleep. Sleep—sleep. Your eyelids are getting heavy, your limbs feel numb, your breathing is slow and deep. Your body feels warm and relaxed. Your eyes close. Sleep—sleep."

She is asleep.

"Now I touch your right arm," continues Liébeault, quietly and with assurance. "You feel the pressure of my fingers. When you wake your arm will no longer be insensitive. You will eat well, sleep well. In a few days you will be able to work as before."

The whole thing takes perhaps ten minutes. The woman goes out smiling. In one treatment her arm is much better. Bernheim sits transfixed.

"How do you do it?" he demands.

"Merely a matter of suggestion. No credit due me — I took the whole thing over bodily from old Braid — oh, with a few little additions of my own. Because, under hypnosis, some of the senses are deadened and others rendered more acute, thus riveting the entire attention on the hypnotist, people in hypnosis believe anything you tell them. Very suggestible — very. Just tell them what you expect and you get it. All very simple."

"Very simple indeed," murmurs Bernheim. "What would you say to having me for a partner, Dr. Liébeault?"

Thus was started the famous partnership of Liébeault and Bernheim of Nancy, which at once began to make history.

For Bernheim knew how to write medical best-sellers and when he began writing about what they were doing at Nancy the medical Brass Hats from Paris, London, New York, with gold watch chains rolling, ribbons tipped into buttonholes, and incomparable bedside manners, began arriving by every train.

They found it difficult to be impressed. Everything here was so commonplace. Liébeault himself seemed to them very limited. He was not interested in Brass Hat matters — elections to academies, decorations, a fashionable clientele, huge fees, or indeed any fees at all. He was interested in only one thing — getting his patients well.

What did they see when they visited his famous clinic?

They saw a kindly old man sitting in a little room off a garden, crowded to be sure, but with such patients! Poor, shabby, and ignorant. And no formality, no dignity even. All chatting and making jokes with the doctor, who hypnotized them while

commenting to his distinguished visitors and jotting down notes. An urchin toddles in, pulls the good doctor's coattails, and demands the penny promised for earning a school prize. In the midst of his explanations to the visiting scientists the old man, with a "Pardon me, gentlemen," turns to two little girls who have tiptoed in and are sitting round-eyed on a couch. He waves a hand at them, says, "Sleep, my little kittens," gives them a mild dose of suggestion, and turns back to his visitors. "As we were saying, gentlemen, suggestion is the whole thing. It is purely subjective. Ah, good morning, Madame Corot — " Not very impressive, you see.

And what did they see when they entered the celebrated office of Dr. Bernheim?

They saw, in a hideous horsehair front parlor, a younger man, bullet-headed, with dark, cropped hair and rosy cheeks, who bounced about as if he were equipped with a superior sort of springs and talked like a best seller.

"Hypnotism, yes, if you wish, gentlemen. But, at bottom, what is hypnotism? Nothing strange and new in the world. Something old and familiar. It is merely extreme suggestibility. Actually hypnotism is nothing, suggestibility everything. We merely suggest to a suggestible person that he become more suggestible. We know that he is extremely suggestible because he has already suggested to himself that he become ill — and taken the suggestion. Therefore a sufficiently strong counter suggestion will remove his illness.

"Not only the hysterical but practically everyone can be hypnotized. You have heard differently, on the highest authority, in Paris. Yes, I know. But *you*, sir, are not a hysteric. Will you permit me?" And with a wave of the hand and a few "suggestions" he has put his distinguished guest into a hypnotic trance.

"There, sir," he announces, waking him, "you see how simple it is to hypnotize a person of the soundest constitution and solidest intellect."

And to another he says, "You, sir, have a patient who can faint whenever she desires. Autosuggestion. Or perhaps you have a patient who is extremely amenable to any suggestions

you may give her. Normal suggestion in the waking state. A force so common it passes unnoticed, but which doctors can use to great advantage.

"That, sir, is my point. We can cure these suggestible people by counter suggestion under hypnosis — and, I maintain, *without hypnosis*. Yes. *By suggestion in the waking state.*"

That was Bernheim's contribution — suggestion in the waking state. We have arrived at last at modern hypnotism and also at a second psychotherapeutic method, suggestion in the waking state. We have come a long way from animal magnetism but we see clearly the logical steps by which we got here. A new theory has been introduced into medicine: the idea that the mind can initiate mental and physical ills and that, by treating the mind, these ills can be cured.

Hypnotism has at last become respectable. It has been rescued from the long-haired, beady-eyed quack and the well-meaning but unscientific amateur and placed securely where it should always have been — in the hands of the medical man.

Hypnotism is a valuable medical method. It frequently, as we shall see later, cures nervous disorders more quickly than do more elaborate methods. But — a lot of people don't stay cured. Why? Because with hypnotism very often only symptoms are removed, and symptoms are results, not causes. Causes lie deeper — in the subconscious mind. The individual who, subconsciously, desires to be incapacitated develops new symptoms as fast as the hypnotist can remove the old ones, since the cause of his illness has not been touched. Is there any psychological method by which the *cause* can be reached — and removed?

Before we come to that, we must hear from a few more men of this period, the late decades of the nineteenth century. You remember Bernheim mentioning "the highest authority in Paris" who did not hold with his views on hypnotism? That is the next man we are to meet.

It is a Tuesday morning in Paris. You would think, to see the queue at the door, that a Bernhardt or a Duse were playing here. But no, it is merely the regular Tuesday-morning lecture of Dr. Charcot, and there is standing room only. Not only doc-

tors and students are there, but everyone in Paris whose name or position will get him in, for this professor puts on a better show than the best actor in town.

Charcot is the director of the Salpêtrière, the largest insane asylum in Paris, formerly a dump for the dregs of French society, which, singlehanded, he has transformed into one of the first and greatest neurological clinics in the world. Here are some five thousand patients — the insane, the idiotic, the feeble-minded, the degenerate, the senile, the prostitutes — all, before Charcot took over, lumped together, unexamined, unclassified, untreated. Just dregs. Such was the way, in those days, of asylums the world over.

Out of this chaos, Charcot has brought order. He has turned an asylum into a hospital and laboratory with every available facility for studying the mentally afflicted.

Charcot has one subject which, above all others, fascinates him. It is on this subject that he is to talk today. As he enters the stage of the amphitheater, equipped like a theater with footlights, there is an instant hush.

This man has no wish to be sensational. He cares not a fig for his audiences. But the whole personality of the man, his black frock coat and flowing tie, his commanding stature, his long black hair pushed behind his ears, his handsome, arrogant face, his lofty manner, his icy objectivity toward his human exhibits, all create the very effect he despises.

He begins in a low, flowing voice.

The five thousand patients in this institution, he explains, represent every type of mental disorder, but so little is known today of these illnesses that it is impossible to classify them satisfactorily, let alone treat them scientifically.

One group, however, in addition to those previously classified, he has been able to isolate. Symptomatically these patients don't appear to belong in one group. Indeed they seem to have any and every sort of mental and physical disorder. One is an epileptic, another a paralytic, another a maniac, another blind or lame or deaf — what you will.

Nevertheless, they all have one thing in common which dis-

tinguishes them from all others seemingly similarly afflicted, and that is that the origin of their disability is not organic. It is mental. This group of patients we call hysterics. It is the peculiar characteristic of these people that they imitate unconsciously the symptoms of almost any disease, even the insanities. They are not true epileptics, true paralytics, but neither are they impostors. They are quite as ill as those they imitate.

You hear a great deal these days of hypnotism, which, once decried by the profession, has recently become a major medical interest. For this he is largely responsible. It is a major interest of his own. You also hear a great deal concerning the marvelous cures worked by certain so-called medical hypnotists. For this he is *not* responsible. On the contrary, he maintains that hypnosis is not a cure. It is a disease. It is the same disease as hysteria. Only the hysterical can be hypnotized. If you are a normal person you cannot be hypnotized. If you can be hypnotized, then you are a hysteric and belong here in Salpêtrière.

Why then is he interested in hypnotism? As a means of studying this disease of hysteria and discovering just how these diseased minds produce the symptoms of disease in their bodies.

Now suppose we hypnotize a few of these hysterics and see if hysteria and hypnosis are not identical.

The audience stirs. This is the moment for which it has been waiting.

Attendants conduct three women onto the stage, place them in chairs well down before the footlights. They smile uncertainly, dazzled by the lights and the audience. Their eyes seldom leave the face of this man who is the God of the only world they know.

Bonnard — Jeanne, Charcot announces. Age forty-six. Seamstress. In Salpêtrière twelve years. Subject to epileptic seizures. He runs rapidly through a description of the other patients. Then he approaches Bonnard — Jeanne, and places a magnet on her chest.

In a few moments, he announces, this woman will be in a hypnotic trance. He need not even speak to her. The trance will be induced by the magnet itself. In this Mesmer was not

the fool he was made out to be. Physical means of themselves will bring on this sleep.

The woman sleeps. And now this unconscious, this ignorant peasant becomes, for the moment, the greatest show in Paris. She is one of Charcot's dozen *grandes hystériques*, the spectacular quality of whose performances caused the medical Pooh-Bahs of two continents to foam with envy.

The great man puts her through her paces, and then the others. At a sign or a word they go into catalepsy or through some of the bizarre postures for which he has coined such intriguing titles as the Attitude of Supplication, the Attitude of Crucifixion, the Attitude of Ecstatic Waiting, the Period of Clownism, and so on. And finally the spectacular *arc de cercle*.

The audience gasps.

These hysterics, under hypnotism, sometimes exhibit even more interesting phenomena, Charcot comments; for example, an actual physical illness. Some of you have seen them produce *l'œdème bleu*, when the hand swells to twice its normal size, turns blue, and becomes extremely cold. Can you doubt then that the stigmata of the crucifixion can be induced by self-hypnosis in a hysterical religious fanatic? Or that blindness, epileptic seizures, paralysis, can be brought on by these sensitives?

But, on the other hand, do you believe that if he were to try to make *you* do any of these things, you could do them? They claim, these medical hypnotists, that they can hypnotize 80 per cent of normal human beings. Do you believe that? He does not. Hypnosis, he is happy to say, will always remain a monopoly of the hysteric.

What then do we learn from such a demonstration as you have just witnessed?

We learn that mental influences can produce bodily symptoms. We learn that disease can be studied by psychological methods, such as hypnotism. We learn that the symptoms of many diseases can be produced or imitated in hypnosis. But we do not learn that they can be *cured* by hypnosis. The mind of the individual can and does influence his body but the day

has not yet come when the doctor can use that power to produce a cure. . . . That is all for today.

This was the sort of show that made the medical men of other countries wild with jealousy, and especially the stolid Germans.

"The Latin race in its decadence," they sneered. "He trains them! Where else do you find patients acting in such an extraordinary manner?"

No, he didn't train them. He had only to pass through the wards and they went into their act. And Charcot said personality had nothing to do with it! That it was a physiological and pathological phenomenon.

That is Charcot. A great man in his day, still a great man. But on most of these counts as wrong as a great man ever was. Wrong on almost every point where he differed from the two old Nancyish doctors whom he despised.

For: —

Hypnosis and hysteria are not identical. Hypnosis is not symptomatic of mental abnormality. Almost everyone can be hypnotized, the healthy and strong-minded more readily than the hysterical. Indeed, the hysterical are comparatively difficult to hypnotize and the insane almost impossible.

Hypnosis cannot be produced by purely physical means, such as magnets, and unknown to the subject. However much he denied it, Charcot could not keep his own personality out of it. Hypnosis is, as the two Nancyites maintained, subjective, a matter of suggestibility, and not a nervous illness. Ninety per cent of us can be hypnotized. And finally it is — let him sneer down his handsome nose as much as he likes at the two doctors of Nancy — of great therapeutic value.

In fact, Charcot was wrong, and Liébeault and Bernheim were right on practically every point of difference between them. It was the psychological explanation of hypnosis and not the physiological one which turned out to be correct. He was as backward and wrongheaded as Mesmer on that point, while they were the forerunners of modern psychotherapy. But this he did do, which they could never have done. By the weight

of his position and prestige and by the force of his personality, he made the medical profession accept the psychogenesis of certain diseases and he made them accept hypnotism as a method of investigation. What had been quackery he made science. Since his day doctors have not questioned that the mind can produce the symptoms of disease. This is his great contribution to psychiatry.

Had he had some of the same warm human interest in getting people well that animated old Liébeault, his theory and practice might have been the better for it. But he was a cold man, Charcot, an objective scientist. So instead of the twelve thousand patients of Liébeault and Bernheim, he hypnotized a bare twelve out of the thousands at his disposal, because, forsooth, these twelve hypnotized best and produced the most interesting symptoms. He did recognize that psychological factors played a part in the origin of hysterical disorders but he put the accent, with all the weight of his personality behind it, on the physiological factors. It was chiefly in emphasis that he was wrong.

The fight between the two schools, in Nancy and in Paris, went on for twenty years. Because of his achievements in other lines and his dominating position in medicine, Charcot prevailed while he lived. But once that powerful personality was removed, it was the theories of the two Nancyites that prevailed, and still prevail.

Nevertheless, in this he was right: hysteria is a disease entity. In setting apart these hysterical and neurotic cases from psychotic individuals, he was the first to isolate these borderline disorders. Before Charcot, either you were sane or you were insane. Now we can all have our little complexes and compulsions and no one points a finger. In fact, it is quite distinguished, like a beautiful head of white hair with a young face.

In his classes Charcot not infrequently called attention to the fact that not only were disabilities sometimes precipitated by hysterical trauma but that even the memories left by the episode might later cause trouble. He never followed up these clues with any great ardor, being more interested in the physio-

logical aspects, but so great a man naturally had many brilliant students in his classes, and among them was a young medical student to whom the psychological aspects of hysteria appeared far more intriguing than the physiological. Up to this time there had been no scientific attempt to get at the psychological basis of hysteria and hypnosis, none to plumb the newly discovered depths of mind. There had been some talk of a "double consciousness" by Braid and others but no real effort to explore and define it — if it really existed.

Now this young student of Charcot's, Pierre Janet, takes it upon himself to find out if there actually is an unconscious or subconscious mind and what it is like. What, he wonders, goes on in those hidden depths?

One day a blind boy is brought to him. His blindness is the result of a fire but the doctors have been able to find no injury to the optic nerve.

Janet holds a bright-colored card back of the lad's head and moves it slowly around before his eyes. The boy does not see it. Now Janet lights a candle, moves it slowly from behind the patient's head until it is within his field of vision — and instantly the boy has a fit.

Here we have proof, argues Janet, that the boy, although he is unconscious of it, does see, for the flame, recalling the fire, renews his fears.

So Janet argues: —

This experiment indicates a dissociation of consciousness. A piece of consciousness has been broken off, has become an island, so to speak. Consciously this lad does not see; subconsciously he does.

The subconscious then has a life of its own. Only when, owing to severe shocks or strains, its content rises to the surface in the form of morbid fears and anxieties, obsessions, phobias, compulsions, fixed ideas, chronic states of doubt and hesitation, do we become aware of these lower depths.

Some of these mental aberrations may be grouped as one disorder, which we may call "psychasthenia" or mental exhaustion. The mental processes of normal people are integrated

into a smoothly running machine but, under great strain, the psychological tension which holds the whole together is lowered. Then bits of consciousness break away, secede from the union of mind, and set up a life and a government of their own. These small new governments are anarchistic and destructive. They produce abnormal phenomena. A man must touch every lamp-post he passes — a compulsion. A woman cannot order a dish at a restaurant without changing her mind a dozen times — *folie de doute*. A child refuses even the toy it desires — negativism.

The disintegration may go further. Instead of small islands, whole archipelagos may split off, and then we have the profound disturbances of hysteria, causing such conditions as blindness, paralysis, anesthesia. In psychasthenia the dissociation is molecular; in hysteria it is molar — that is, large masses split off. In hysteria the mental processes involved become entirely independent of the rest of mind, whereas in psychasthenia they are merely — well, loosened. They are still in touch with the mainland, still somewhat under its sovereignty, and so the individual remains pretty well adjusted to reality — just a little queer.

So reasoned Janet.

This is new talk. Brilliantly illuminating the submerged continent of the subconscious mind.

But Janet, like Charcot, his teacher, was really more interested in unraveling the mysteries of the abnormal mind than in treating it. There are always these two types of doctors (we shall meet them in every chapter), those to whom their patients are more guinea pig than human and those who would rather cure one human being than discover any number of scientific facts.

But Liébeault and Bernheim, as well as Charcot, had their descendants.

Suggestion, as practised by them, was all very well in its way, but a little too simple-minded, decided two doctors more sophisticated than the homespun men of Nancy. After all, it depended for its results upon a quality of very simple people

— faith. "Believe and will." Become as a little child. Have faith in your physician — faith that you will be cured.

All very excellent. But somehow — surreptitious. And suppose you can't have faith? Suppose you're a congenital skeptic? Suppose you find all this decidedly irrational and even a little ridiculous? Must you therefore go about harnessed with your compulsions and phobias the rest of your life? Or is there perhaps some higher quality to which the physician can appeal?

Yes, said one of these two new men, there is reason. Surely we can accomplish more by an appeal to this highest faculty in man than to anything so elementary as faith. Besides, not every physician can inspire a blind credulity in his patients. Must he therefore give up practice? No — let us explain to the patient the aberrations of his mental reactions, show him where he has gone wrong and what he must do to become normal again. To understand is the beginning of cure.

The physician who thus reasoned called his new method "persuasion." He was Dr. Dubois, who even today ranks as one of the greatest of French psychiatrists. Suppose we look in on him as he attends a patient.

The room is dim. Curtains drawn, aromatic spirits in the air, the family on tiptoe. A little more and they would have laid straw in the street.

The lady, in the throes of a heart attack, is too weak to speak, merely rolls her eyes. Dr. Dubois feels her pulse.

"Yes, quite rapid," he says. Her temperature. Yes, some fever. He sits down.

"Now, Madame Lafitte, let me explain something to you. You *are* ill — but you need not be so very long. This is a heart attack — but not one which could not have been avoided. You *are* an invalid — but of your own making. You *have* had heart trouble since childhood — but only a negligible sort of heart trouble. A murmur. What is this murmur? Nothing serious as some doctor perhaps was ignorant enough to imply. No. When you stand or sit, you don't have this murmur. When you lie down, we can detect this murmur. Why? In that position, in your case, the heart brushes against certain tissues, causing a

little — well, swish, like a skirt on the floor. Is that serious? Does it matter one way or the other? No more than that your dress brushes against a chair in passing.

“What brought on this attack? Don’t tell me — I’ll tell you. It was not brought on, as genuine heart attacks are, by overwork, a shock, anxiety, emotional strain. It was brought on by a tantrum — probably because your husband couldn’t give you that string of pearls you wanted to wear to the Meunier ball. Is that worth dying for? I do not conceal it from you — such attacks can be serious. Only yesterday I saw a man die of just such an attack. He witnessed an accident — merely witnessed it. He had no organic heart trouble, but he had cultivated these attacks all his life and thoroughly believed in them.

“No, there is nothing wrong with your heart, no more than is wrong with thousands who live to a ripe old age. What is wrong with you is your attitude toward life. You are not an indispensable person in this world, yet you expect the world to pay you a very high price for being here. The world owes you nothing — quite the contrary. You can’t face even the smallest disappointment. You have no courage, no stoicism. Life is not tailored to us, Madame Lafitte. We must adjust ourselves to the world we live in.

“You must learn to practise self-mastery, which alone gives us the mastery of our destiny. In a word, if you wish to avoid these attacks, you must re-educate yourself. Learn the ugliness of egoism, fix your vacillating attention on higher things than pearl necklaces, find worthy purposes.

“I am not prescribing anything too difficult. I have had hundreds of patients with far more serious disorders than yours, who are far less intelligent than you, who, in a few weeks, sometimes in a few days, succeed in altering their point of view, in seeing things from a different angle. As they recover their mental calm, their functional troubles disappear. So will yours. Even now you are better than when I came in. Your pulse is less rapid. Your fever is subsiding. In a very short time this attack will be over. Let us see to it that there are no more.”

Thus Dr. Dubois. He leaves his patient almost normal. . . . Persuasion — the appeal to reason.

Yet wouldn't you say the doctor has counted himself in for too little? Isn't it again — as with Mesmer, with Braid, with Charcot — the personality of the man, as much as his method, which produces the desired result? Perhaps the appeal to reason is more efficacious than the appeal to faith. Perhaps persuasion is an advance over simple suggestion, but —

"Reason?" said Dr. Zilboorg, a psychoanalyst, to me recently. "Appeal to the reason of a potential suicide? I'd never try it. Even a normal human being isn't any too reasonable. Our one chance is to appeal to his emotions. We must try to counteract one emotion with a stronger one, an unhealthy emotion with a healthy one — or lead the destructive emotion into a new direction. We are almost exclusively creatures of our emotions and instincts."

That was where Dejerine, the second of the advocates of persuasion (a different brand), started.

A stronger fulcrum than faith, yes. But this fulcrum was not reason — it was emotion. How shall we enlist the patient's emotions — and what emotions?

Thus: —

First, we shall explain to the patient the nature of his illness. This is an appeal to his reason.

Second, we shall establish between ourselves and the patient an emotional bond of confidence, sympathy, liking, co-operation, so that our relationship is in itself *suggestive* of beneficial results.

Third, we shall put to work the various constructive elements of the patient's personality. These healthy emotions will override or remold the destructive emotions which are responsible for his condition. We shall appeal to his ambition, if he is an ambitious man; to her religious feeling, if she is a religious woman; to love of family, patriotism, and so on. These elements of the patient's personality become the starting point for the effort he must make to regain self-control. Between the doctor's reasoning and its acceptance by the patient there must

intervene the element of feeling — feeling between the two and a new emotional attitude toward life on the part of the patient.

Now we begin to see what is emerging from the work of these new men. Man is regarded as something more than the sum of all his parts. He can't be divided into organs and dismissed as a "mere neurasthenic" if no organ is found guilty. He must be treated as a whole, an individual who lives as much by his ideas and emotions as by his organs. We hear, for the first time, of "rational therapeutics," "re-education," "moral orthopedics." The "daily conversations" of Dubois are found to do more for these patients than all the douches and bromides which were formerly their lot. . . . Psychological medicine is here at last.

You see how far, yet always developing from it, we have come from animal magnetism, and how close we are approaching to modern psychotherapy. Medical science was reluctant to admit the soul of man into its calculations — in some quarters it still is. "Psychology deals with nonmaterial and nonspatial processes and therefore must be held unreal. It has no claim to be called a science," it was, and still is, said. So how can medicine accept it? "The nasty little science," these men called psychology.

But today we are less inclined to deny the reality of nonspatial and nonmaterial things. Is love unreal? Are the ideas of Hitler unreal — because they don't occupy space and can't be seen or touched?

We are almost ready now for the spectacular developments of the new century. We have traced the psychological approach to mind from Mesmer to Dubois and Dejerine. We are ready for Freud.

But now we must step back once more into the nineteenth century in order to see how the followers of Broca, the proponents of the physiological approach, are faring, and bring that half of psychiatry up to the period of World War I. We shall meet some exciting men — men who aren't much heard of outside medical books, but such is our gratitude toward our benefactors. Perhaps we can rectify that a bit.

## VII

# *No Psychologists Need Apply*

AFTER the fall of Belgium, during World War II, a sign appeared one morning over a shop in one of the occupied cities. It read: —

“We would rather do business with Germans than with Belgians.”

It was a coffin shop.

A similar sign was hung out (and is still often hung out) by medical organizations during the period we are now to discuss, the latter half of the nineteenth century.

“We would rather do business with physiologists than psychologists.”

Medicine is a science. Science, these men hold, deals with material things, existing in space, present to the senses. It desires no truck with nonspatial, nonmaterial phenomena. It has small use for the “nasty little science” of psychology.

That was why Mesmer was driven to find a physiological explanation for animal magnetism.

That was why Braid first explained hypnotism as due to exhaustion of certain nervous centers.

That was why Charcot insisted on the physiological pathology of hysteria and hypnosis.

They were men of science. Psychology smacked of black magic and could never be accepted by any self-respecting medical man. “No psychologists need apply.”

From the earliest dawn of medicine cures had been worked by the laity by many and various unscientific methods. Kings,

peasants, witches, saints, priests, had cured through the laying-on of hands, the king's touch, amulets, prayer, the casting out of devils, shrines. Of all such unorthodox procedures medicine washed its hands.

But hypnotism, the doctors found, could not, with any amount of scrubbing, be washed away. Medicine was challenged to explain its cures, and, as we have seen, finally and reluctantly accepted a psychological explanation and opened its doors a niggardly crack to a few medically certified psychologists — men, it was felt, who were no sounder than they should be.

The war between these two methods of approach to mind, the psychological and the physiological, goes back to pre-history. Cavemen, forced to deal with a socially unacceptable member of the tribe, resorted to both methods. Either the medicine man cracked open the skull of the offender with crude stone implements and, after indescribable explorations and excisions, replaced bone and scalp and left him to recover his wits and his blood pressure as best he could, or, with mutterings and magic, cast out the devil controlling him. Always there have been these two points of view and these two ways of treating the disturbed mind, always they have been opposed, and, in spite of the fact that most psychiatrists now assert that the two are indissolubly bound together, they are often more violently opposed today than ever before.

However, it had never actually come to open and declared war until that skirmish between the Salpêtrière School under Charcot and the Nancy School under Liébeault and Bernheim because the issues had not been clearly enough defined. With that opening campaign the war really got started, and the psychologists, quite unexpectedly, gained the victory.

During the half century since Charcot, the war has increased steadily in scope and intensity, with now one side, now the other, winning a signal victory. But it isn't until our own day, with the flower of the psychological school and the *jeunesse dorée* of the physiological school making their undreamed-of contributions, that it has reached its furious climax.

Now let us see what, while the hypnotists and suggestionists

were getting one foot into the crack of the doors of the medical societies, the Old Guard were doing.

They had taken the stand that disorders of the mind, exactly like disorders of the body, are physiological diseases.

Such a position must be founded on a sound pathology, and there was very little pathology and not much of it sound until the latter half of the nineteenth century rolled around. Without autopsies, operations, or the scientific use of the microscope, how could there be? There wasn't even a vital science of medicine. It had, since the days of Hippocrates and Galen, been falling, falling, falling — falling from its high estate, until it had finally landed in the barbershop and was dispensed by the local Figaros.

"No, no — no charge for the haircut," said a barber to Broca. "Can't charge a brother practitioner, you know."

Medicine had become, and during the eighteenth century remained, largely academic and didactic — "Galen says —", "Hippocrates proved —", "According to Aetius —" and occasional references to later men. There was no such thing as laboratory research and very little, and that superficial, clinical observation. So there was no real science of medicine.

Then, in the latter half of the nineteenth century, came the Periclean Age of medicine — Semmelweiss, Koch, Lister, Metchnikoff, Broca, Holmes, Loeffler, Virchow, Pasteur, making their magnificent contributions. Disease after disease was conquered, every cranny of the body explored and mapped. In view of all this, the men dedicated (or doomed) to the care of the insane began asking themselves if all these great discoveries were going to pass them by, or if, perhaps, physiology and medicine might not be able to throw some light on the cause and cure of mental disorders.

There was, for example, a man named Brown-Séquard, sometimes called "the Great." He is one of those benefactors of mankind of whom you may never have heard, but I assure you he's worth meeting. A great personality as well as a great scientist. You couldn't shake hands with the man without thinking, "Good Lord, I've certainly met Somebody!"

He was by birth American, French, and English, with the energy, brilliance, and doggedness of all three. One of the few things he was *not* was a psychiatrist, yet, as you'll see, he belongs in this story. He was, however, a physiologist, a doctor, an obstetrician, a professor, a dramatist, a lecturer, a writer of plays, poetry, and romances — and good at all of them. He practised simultaneously in London, Paris, and New York, darting back and forth across the Atlantic like a human shuttle (sixty times in all) in a day when shuttling wasn't so simple as it is today. He taught at Harvard, the Collège de France, in Geneva, Richmond, Glasgow, London, Dublin — to give you a notion of his agility.

All this time he was doing an extraordinary amount of original research. Here his methods were unique. For example: —

Wishing to know exactly what takes place in the stomach during the process of digestion, he tied a sponge to a string, swallowed it, and after several hours hauled it up hand over hand, squeezed out the gastric juices and liquefied food, and examined them under his microscope. As a result of this practice, continued over many years, he attained a state rare in man, universal in cows: his food automatically came up after every meal to be rechewed. His hitherto perfect digestion was ruined.

His own body was, on many occasions, his laboratory. He was his own best guinea pig. By such methods he became one of the greatest discoverers of facts concerning the human body we have ever had.

He was not, we have said, a psychiatrist. But he was insatiably curious concerning any and every process of the body, and the physiological processes that account for the way the mind functions could not escape his consuming curiosity. He pried ceaselessly into the activities of the nervous system and, even as a young man, made discovery after discovery without anyone paying much attention to him.

Then one day a distinguished member of the profession arose in a medical convention in Paris and asked how it was that no one had ever called to their attention the many "beauti-

ful experiments" of a certain Brown-Séquard. Everyone goes along, he said, diagnosing and prescribing and operating on the basis of the old physiology of the nervous system as laid down by Charles Bell just as though nothing new were ever going to be discovered. Gentlemen, I warn you, this Brown-Séquard is discovering something new almost every day.

Take this matter of the sensory nerves. We have always taken it for granted that the sensory nerves run from the right side of the brain to the right side of the body and from the left side of the brain to the left side of the body, as do the motor nerves. But no, gentlemen. Definitely, *no!* The sensory nerves do something quite different, as Brown-Séquard has discovered. They *cross* in the spinal column to run to opposite sides of the body. What do you say to that?

And that's not all. That's just a starter for a man like this Brown-Séquard. There's also the little item of the conductivity of the gray matter — but why go on? The whole science of physiology, thanks to this indefatigable discoverer of facts, is toppling about our ears and —

He strongly implied that they would wake up only in time to pick the plaster out of their hair.

The distinguished scientist who delivered this address? None other than Broca.

That fixed it for Brown-Séquard. From then on he was read, quoted, elected, degreed, medaled, chaired to within an inch of his life. As he deserved to be.

But being the sensational old boy that he was, Brown-Séquard saved his most spectacular feat as a climax to his life.

Came his seventy-second birthday — and naturally he resented it. He was an old seventy-two. He'd burned the candle at both ends, making a lovely light. He'd worn out research funds and university chairs and wives — and he showed it. He began thinking about this sorry business of getting old.

Actually, what is it? Everything cracking up at the same time — or some one chemical perhaps, which, when we quit manufacturing it in the internal chemistry of our bodies, slows down the whole machine?

And then he guesses: a glandular secretion? Possibly. . . . Probably. . . . Almost certainly! How has he overlooked this possibility? He, the founder of the doctrine of internal secretions, not to have thought of this sooner — before it was too late! Way back in '56 when he had made those beautiful excisions of the suprarenal capsules in animals (producing an exaggerated Addison's disease) — why hadn't he thought of it then? Or when he first began to use testicular and other organic juices as remedies — or when he showed that the kidney produces an internal secretion — why has he never, never once in all these years, glimpsed this amazing possibility? Stupid as a cow you are, Brown-Séquard! No one but you would miss a trick like this, old dunderhead, old fool — old, old, *old!* If you'd only thought of this in time, perhaps —

Is it even now too late? Is the whole idea fantastic? Of course — but science is fantastic, nothing more so.

So once more, at seventy-two, he began feverishly (for he hadn't much time now) experimenting on himself. And one spring day in 1889 he sauntered out onto the lecture platform of the Society of Biologists in Paris looking young enough to be his own son, full of bounce, rosy of cheek, bright of eye — and what an eye! He cast it now over one of the most astounded audiences it had ever been his pleasure to face. And he spoke somewhat as follows: —

"Gentlemen," he began, "I'm going to reveal to you a secret which long ago alchemy gave up. But science never gives up. It will one day discover *all* the secrets — not one will be left.

"I know what you are thinking — 'Why, the old boy looks younger than he did twenty years ago!' True, but I don't just look younger — I *am* twenty years younger. My blood, my arteries, my heart (in both senses, my heart), my mind are all twenty years younger.

"This is not merely a general feeling of well-being. How long is it since you saw me run upstairs, I who used always to run? I run upstairs now just as when I was a young man — and that is not one of the smallest joys in life, gentlemen.

"For twelve years now I haven't been able to work more

than one hour a day, and even so I was exhausted — and that is not one of the smallest sorrows in life, gentlemen. But now I can work at night after working a full day in the laboratory.

"I was always a strong man but of late years even to hold a book tired me. Last Tuesday I was tested by all those little machines we keep in our laboratories for such purposes, and my strength was recorded as exactly what it was twenty-six years ago.

"There are, besides, all those nagging little disabilities of old age — digestion, elimination, respiration. They have all returned to the smooth functioning where I am not even conscious of them — and that, gentlemen, is youth.

"What I have done, you can do. How? I shall tell you.

"Go home to your laboratories, prepare, as I shall direct you, water extracts of the secretions of the testes of a dog, inject them by hypodermic under your skin, and you will soon be, as I am, mentally and physically twenty years younger. That's all there is to it, gentlemen. Science is as simple as that.

"When I embarked on this search for youth, I didn't have far to look for my cue. I merely glanced behind me, at the chair I occupy in the Collège de France — that chair which was once occupied by our greatest physiologist, Claude Bernard. It was he who first called our attention to these internal secretions of the ductless glands and bade us examine them. Well, I have spent a lifetime examining them, and one I discover to be the gland of youth.

"Gentlemen, I may live forever!"

There was no denying it — old Brown-Séquard was completely transformed. A failing memory restored, energy redoubled, a mind which had lost its edge made keen again. He even came down with that childhood complaint — whooping cough.

So that when, five years later, he died, with all his faculties still as keen and all his great qualities of mind and heart still as vibrant as in youth, "His death, if not actually premature, was certainly unexpected."

Then how is it, you ask, if Brown-Séquard discovered, way

back in 1889, the secret of youth, we don't all, turning the corner at fifty, rush off to our doctors, get a shot in the arm, and return to the days of our youth?

Because, alas, Brown-Séquard was wrong. He may possibly have been on the track of the secret of youth but he didn't actually discover any specific method of restoring it. Since his day there have been several attempts — you've heard of them, Steinach, Voronoff — all along the same line, and perhaps some day one of these methods may work well enough so that all of us will get our revitalizing shots. For quite likely, if and when it comes, it will be some such secretion as Brown-Séquard guessed at.

Not very long ago Dr. August Werner made public announcement that a new male sex hormone, testosterone propionate, fifty times more potent than the only other known male hormone, androsterone, when injected into men who are beginning to crack up brings about a remarkable resurgence of physical and mental vigor. Brown-Séquard was right in this — that the deterioration of old age is partly due to the decline in functioning of the ductless glands, and particularly the sex glands. If you can restore their activity by the injection of hormones, you can hold old age off an appreciable time. Men, like women, Dr. Werner said, go through a climacteric period (around fifty) during which they have much the same symptoms — intense nervousness, emotional instability with irritability, depression, moodiness, decreased power of memory, of concentration, and of interest in their usual activities — yes, even crying spells. Inject this new hormone, he recommended, and very quickly these symptoms disappear and the men recover all their former drive. That was a brilliant guess of old Brown-Séquard.

And in return science did work for him that one little miracle he asked of it — for him, but for no one else. His actual compound was worthless. His rejuvenation was entirely due to suggestion. He believed in his compound and so it performed a miracle for him — which is the way miracles work. And plugging away in his laboratory, grinding up and pounding and liquefy-

ing the testes of dogs to prepare a sex hormone, he opened up a whole new science, a science which is to throw a brilliant light on the functioning of the mind . . . as we shall see in a moment.

Now we come to our next man.

Brown-Séquard was the father of endocrinology. What we need now is a father of neurology.

The man with the best claim to this title has been, by some scientific writers, placed with the three highest-ranking intellects humanity has produced — Aristotle, Newton, Darwin. The fourth — Hughlings Jackson . . . Let's have a look at him.

He sits one day in a meeting of the British Association for the Advancement of Science which is being addressed by — we hold no brief for this man, merely quote the record — Broca.

Now Jackson, according to his own account, was a young man who had "very little education, thank God, because he was thus forced to do his own thinking." He was one of those inflammable persons who easily catch fire from an idea and stay on fire until they light up the countryside for miles around.

It was easy to take fire from Broca, who never made a mediocre speech in his life and made many inspired ones. On this occasion he spoke on his favorite theme — the little knowledge man had acquired concerning the mechanisms and functioning of the brain, the much there was to discover.

We made a start, he suggested, with our investigations into cerebral lesions and their associated defects of speech. Our studies of aphasia have opened up a way to locate the various faculties of the mind. But did we go forward on these new pathways? Did we press on to new discoveries concerning these mysterious minds of ours? I'm afraid not, gentlemen. So much the greater the responsibility — and the opportunity — of those who will come after!

And young Jackson thought: —

To be the Columbus of the mind! To explore the physical habitation of this thing called mind, to trace its faculties to their source in that unique gray tissue which lies coiled within the skull, to study its mechanisms, to discover how it gets out

of kilter and how to repair it — to accomplish even the smallest part of all this would make a man feel that the explorers of the earth had a pretty thin time of it.

Wandering out of the lecture hall, probably even before Broca finished (for all his life he was so restless that he habitually left a dinner before the entree, a play after the first act, a medical conference during the reading of the minutes), young Jackson there and then decided upon his life's work.

He became a neurologist. He took for his province the brain and nervous system, revealing, by his investigations into their diseases, more concerning the nature and functioning of the normal mind than had ever been learned from the study of the normal mind and brain.

For fifty years Hughlings Jackson explored the brain, discovering more about it than all the researchers before him or since. Suppose now we were to ask him to sum up briefly the findings of those fifty years. He might, restless, shy, a little bored, fidgeting to get it over with and be done, say something like this: —

"All that I have discovered about the brain can be put into three words: I Darwinized neurology. I simply took Darwin's theory of evolution and clapped it onto the brain. Man is descended from earlier species. If his body, then necessarily his brain. It, too, has evolved from primitive forms. What proof have we of this?

"Take a frog, remove from its skull the entire brain — what happens? The frog can still turn over when laid on its back, jump, rub an irritant off its leg. A brainless pigeon can still fly, a brainless rabbit can still hop about — all complicated, *ordered* movements. Ordered by what — since the brain is gone? Ordered, it must be, by a lower brain. Can we find that brain? Yes. It is the spinal cord and the basal ganglia which control automatic actions. That was the earliest brain.

"The second brain to evolve (you see, I'm still just applying Darwin to my own subject) was the motor cortex, located in mid-skull, which gives us a type of action called *Intermediate* since it is between the automatic and the voluntary. The third

the latest, and the highest brain to appear was the cortex with the frontal lobes which gives us voluntary action. That brain lies in the forward part of the skull.

"Now when disease strikes, what happens? Dissolution, the opposite of evolution, takes place. The human being regresses in the reverse order from which the human species progressed. The highest brain is the first to be impaired, then the next lower and lower in succession. The patient deteriorates intellectually from one brain level to the next lower and biologically younger. This is as strange as anything in this world — but it is true.

"Thus, in those who become mentally ill, the frontal cortex, being the latest addition biologically and therefore the least well-established, the most vulnerable brain, is first affected. The next youngest biologically, the motor cortex, stands firm a while, carrying the patient along on a lower level of conduct and intelligence. Then it in turn succumbs, and only automatic action, on the third and last level, remains. Finally that, too, may be impaired, and you have patients who cannot even swallow.

"Always, unless the disease is arrested, the patient passes from a more voluntary to a more automatic state as successively lower levels of intelligence come into control.

"To sum up, the same fundamental principles apply to all nervous diseases whatsoever, from paralysis of an external rectus up to insanity. All that I learned I learned as Broca did — from the study of the diseased brain and nervous system, investigating cases of aphasia, hemiplegia, lesions of the brain, paralysis, defects of sight accompanying brain disease, epilepsy, and diseases of the nervous system accompanying inherited syphilis. I know of no better way of spying upon what goes on behind the locked doors of the mind — which disease throws open.

"They say I did much toward locating the various faculties, discovered much concerning the form and functions of the motor centers. They say that I was one of those whose ideas have changed the world yet are so familiar to everyone today that they seem always to have been known. Perhaps. I only

know that even today we have conquered just one small corner of the vast unexplored territory of man's mind. What I accomplished is an infinitesimal part of what remains to be done."

That's Hughlings Jackson for you. Pay no attention to those deprecatory remarks of his about his work. He's just being British. No one else ever had such insight into the pathology of the brain and nervous system. No one else ever drew such original and inspired conclusions from the scientific facts observed. Just that one inspiration of applying the theory of evolution to the brain (you can see now where Tilney got his idea) revolutionized psychology. Never again could it be the nasty little science it had been before. Mind was no longer something static and definitely limited but something in process of becoming. We cannot understand mind at all unless we look at it in the light of evolution, seeing it for what it was millions of years ago and what it is on its way to becoming millions of years hence.

You must picture our next man as practically living in a laboratory, clad in the long linen duster which is the uniform of the research worker. Speak to him as he bends over his test tubes, microscopes, and Bunsen burners, and he will drop his head a little lower to peer over his spectacles with an absent-minded "Eh?" and then, if what you say interests him, will come up with a twinkle out of the too-big wing collar and over-size tie which the old boys of the nineties wore, his dark eyes shining, his bald pate reflecting the high lights, his neat goatee punctuating his careful sentences.

This is the man who is called the father of American pharmacology, who was also, if we call Brown-Séquard the grandfather, the father of endocrinology — John Jacob Abel.

It was quite as much the thing, in Abel's day, for a young medico to go abroad to study and to acquire the glamour of a foreign background as it was for an artist or singer. News — scientific news particularly — didn't get around in those days as quickly as it does now, and you practically had to be *in* Paris or *in* Berlin or *in* Vienna to get the latest dispatches from the

medical front. Science was still very largely handed down by word of mouth from spiritual father to son.

So young Abel went abroad. And in Vienna he heard about the extraordinary experiments of Brown-Séquard with the glands of dogs and he said to himself, "Well, it didn't work — but I'll bet the old boy was a darn sight nearer the truth than anyone suspects. I think we've been laughing on the wrong side of our faces."

So he decided (in science this is possible) to choose as his father Brown-Séquard, and no other. He laid out for his life-work the study of our internal chemistry and, more specifically, the chemistry of the ductless glands.

After a lifetime devoted to this subject, he said, "We human beings are walking drugstores." And he didn't mean because of the stuff we pour into ourselves but because of the stuff we manufacture internally. Four hundred years before, Paracelsus had said, "In the human being there is present an invisible physician who produces, prescribes, dispenses, and administers suitable remedies as occasion demands. Had not God created these internal remedies, then, notwithstanding all the efforts of all our physicians, not a single creature of the earth would remain alive."

Four hundred years later Abel proved this scientifically.

That was important but it was nothing to what was to come.

So far, in the search for mind, where have we looked? In the brain and the nervous system. There, and there only, it has seemed down to this moment, must be the seat of mind. All the rest of the organism, mindless, takes orders from these higher centers. No other whereabouts of mind has even been imagined. But now!

On the occasion of his receiving one of the medals that were always being pinned on his reluctant chest, Abel spoke somewhat as follows: —

"As you know, it has always been taken for granted that the nervous system is the sole intermediary between various parts of the body. Nervous impulses (and a nervous impulse is quite a different thing from an electrical impulse) are carried along

a complicated system of nerves to and from nerve headquarters, just as messages are sent over the telegraph wires by electrical impulses. Certain control stations in the brain, the spinal cord, and the peripheral autonomic nervous system, co-ordinate our functional activities by means of this telegraphic communication system and, according to the old idea, *solely* by means of this telegraphic communication system. But now what do we discover? We discover that there exists within our bodies a second communication system, linked with the first but entirely different.

"You remember how, before the days of the telegram, we used to communicate — and still do? By the postal system. Well, in our bodies we also have a postal system. Little packets of chemicals are sent out like letters by the organs of internal secretion (the ductless glands), hormones we call them (meaning 'I stir up — I excite,' which is just what a letter should do), and are carried by the blood stream to their proper destinations.

"These are frequently letters of the utmost importance, special delivery letters. The delivery of the correct packet of chemicals to the proper address at precisely the right moment may mean the difference between life and death. One millionth of a grain of pure adrenalin (one of these hormones) will raise the blood pressure of an adult ten millimeters, and the baby pronounced dead may be given life by a single injection of it. 'The dead in mind and the deformed in body may be restored by these internal secretions,' said Osler.

"There are a number of ductless glands sending their dispatches to all parts of the body, and these hormones not only affect us physically but mentally. To a very large degree they determine what sort of person each one of us is. For example: —

"Some years ago Walter Cannon admitted first a cat and then a dog into his laboratory. In the thick of the combat he seized the cat, laid it on the table, and proceeded to examine the secretions of certain of its glands. What did he find? That adrenalin in wholesale quantities had been poured into the blood stream of the peaceful, domestic animal, causing its muscles to contract with great violence, its fur to rise, its eyes

to glare — causing, in a word, *rage*, to stir up defensive action.

"The difference between a timid man and a top-notch fighting man is just that — the amount of adrenalin poured into the blood stream.

"In this manner do all the glands of internal secretion help to mold our personality, making us energetic or lazy, enthusiastic or stolid, passionate or frigid, brilliant or moronic. There is no aspect of our personality but is influenced by the activity of these glands, which have been called 'the glands of personality,' 'the glands of destiny.' All this, however, is the province of the psychologist. My job was merely to isolate some of these hormones so that they could be studied and their effects noted."

Merely that.

It had never been done before. Pounding up the gland itself, as Brown-Séquard had done, is not discovering just what chemical secretion it is that produces its peculiar effect. To *isolate* that active principle is a very different thing, and very, very much more difficult.

Abel spent a lifetime at it, personally inventing this new science of endocrinology and stirring up an enormous amount of research in new fields of physiology and psychology.

He started with a bit of sheep's gland, working up, in the course of years, to thousands of sheep's glands, grinding, powdering, mixing, distilling hundreds of pounds of them in the endeavor to wring from them a few drops of their essential chemical. And one day in 1897 he came up with a twinkle out of his too-big collar to announce to whoever might be within ear-shot, "Well, I think this time I've got it. I'm practically sure that I've obtained, in almost pure form, an active principle of the adrenal glands."

A small, modest statement to which no one paid any particular attention at the moment, because — what of it? What was it good for? How could it be used? . . . It was just a laboratory experiment. But for all that, it was the first time the active principle or hormone of a ductless gland had ever been obtained — and it marked the beginning of a new approach to mind and

personality. From that day on mind and personality had to be figured in terms of hormones as well as of brain cells. You can remove half a man's brain without depriving him of an iota of intelligence, but remove one little ductless gland and you make him an idiot for life.

Before he hung up his linen duster for the last time, John Abel had isolated active principles of several glands. We *are*, he and those who followed him showed, the products of our internal chemistry. Before he died he had the scientists of Europe dashing over here to study endocrinology just as, in his young days, our American doctors used to rush off to Europe. Which, in itself, was no mean achievement.

We return you now to Germany. We introduce you to Emil Kraepelin, the father of psychiatry. Emil Kraepelin's spiritual father was a Wilhelm Griesinger, who laid down two fundamental principles of psychiatry: first, that mental disorders must be classified, and second, that they must be traced to their source in diseases of the organs before they can be intelligently treated. You must take as your starting point the indisputable fact that there can be no mental disorder without a physiological abnormality. And if you don't find it, don't conclude that it isn't there, but only that you, with your clumsy methods and great ignorance, can't locate it. *It is there*, somewhere in the body, waiting for men with greater knowledge to discover it. A day will come . . .

The day came with Kraepelin.

To look at the mass of work this man accomplished, you would say that ten other men must have done it. It was encyclopedic. It was monumental. Only a Human Dynamo could have done it. And yet he was a man who was as much in love with life as with work, a man who must travel or die, a man who must write poetry or burst, a man who must love and laugh and every so often go on a picnic. It was the inexhaustible energy of the man which, even in his old age, appalled his juniors, that made it possible for him to produce, single-handed, the work of an entire research laboratory.

When Kraepelin went to work, in the second half of the

nineteenth century, medical science had been completely transformed by the great discoveries clustering around 1860. Not only had anatomy and physiology been made over but entirely new sciences had appeared — bacteriology, biochemistry, endocrinology. Now a man could lay his hands on almost any sort of facts he needed. So Kraepelin proceeded to lay the foundations of psychiatry and build it into a science.

Here is his credo: —

There is no such thing as mental disease. There is just disease. Some diseases show dominant symptoms in the psychological sphere, and these we *call* mental diseases, but at the root they, too, are physiological or organic diseases.

Mind and body cannot be separated. For every mental process, normal or abnormal, there is a physiological or organic background. If the mind is disordered, then somewhere in the body lurks a disease process which has precipitated this disorder — damaged tissue, an infection, a lesion, a disordered gland, a toxin, a bacterial invasion, a dysfunctioning organ. We must search the body until we find it. Mental diseases can be explained only in terms of pathology and heredity.

Only the objective natural sciences form a legitimate basis for psychiatry. A subjective psychology is untrustworthy, unscientific — *verboden*. It can never yield a true understanding of the psychoses.

Only a disease process of some sort can account for the gap that yawns between the normal human being and the schizophrenic.

One cannot, even if one is Kraepelin, make such statements as these without backing them up. Kraepelin backed them up with a lifetime of research.

He developed a new method of investigation. It is not enough, he said, to study a patient as he presents himself to us in the asylum. Insanity is not an isolated episode in a life. It is a way of life, continuing often from birth to death. We must review the whole life of the patient even to a childhood attack of an infectious disease. We must endeavor to unearth the beginnings of this disease, that first faint clouding of the mind

which announced the disaster. And we must note and record every stage of its advance up to complete deterioration, if that is to be the end. Only by piling record on record, comparing, and drawing the inescapable conclusions shall we be able to discover causes and step by step build up a science of psychiatry.

With the records which he made over a period of fifty years, Kraepelin was in a position to make that classification of mental disorders which Griesinger had attempted. From the lightest feather of a neurosis up to the total disintegration of the personality, as in paresis, each and every disorder was classified and described, and, whenever possible, its origin given. On this encyclopedia of the mental disorders stands the whole structure of modern psychiatry. Kraepelin saw, and he made others see, that psychiatry was a science in itself and could no longer be compressed into neurology.

In carrying out this first task set him by Griesinger, Kraepelin was impressive. But the next step, to discover the physiological bases of these diseases — that was a very different matter. Medical science has never been faced with a more baffling problem. For often the insane patient appears to be as healthy a physical specimen as any normal individual. How then put a finger on that subtle bodily disease process which makes him laugh where others would cry or suddenly strike the attitude of a Napoleon?

There were already some established causes of mental disorders. Some types of insanity and lesser mental illnesses were definitely traced to alcohol, drugs, trauma, cerebral arteriosclerosis, senility; to infections, toxins, degeneration of products of the nervous tissues — to these and various other organic causes. True. But all these accounted for only a very few out of that long line of patients who presented themselves at the asylum doors. And if you proclaim from the housetops that *every* mental disorder is rooted in an organic disturbance — and then you can't produce the organic disturbance . . . !

Never fear, we'll find it, Kraepelin and other adherents of the physiological school announced confidently. Not for a mo-

ment were they going to admit that the psychological boys had won more than a temporary and insignificant victory in their treatment of hysterics and psychasthenics. So with scalpel and cultures they went to work.

All through Kraepelin's long life (he lived to be seventy in 1926) they were hard at it, endlessly producing new facts on which he could build. The pathological anatomists got off to the first gun. They made their initial attack on the brain. There, in the organ whose function is thought, would surely be found the pathological condition responsible for the disorder. Had not many types of abnormal conduct already been traced to brain lesions? Very well, by more minute and scientific exploration, other causes would be found. With microscope, tissue stainings, brain sectionings, they probed every crevice of the brain, and finally were able to report quite definitely and emphatically — that they could find no anatomical basis whatever for the major insanities.

Bring up the biochemists. They subjected the brain and the nervous system to every conceivable chemical attack. Nor did they stop there. They went on to the blood, the urine, the body tissues, the nerve fibers, the intestines, the gall bladder. Theirs was a different tale. They did not report that they could find nothing wrong. Quite the contrary. They found plenty wrong. No bodily chemical but was found responsible for some mental disorder. Now it was too little calcium and now too much sugar; now a dearth of hemoglobin and now of choline in the cerebrospinal fluids. Next it was toxins — toxins from diseased tonsils, sinuses, teeth.

All these leads the doctors followed hopefully. They tried out everything the laboratory men recommended. Focal infections? Great! They snared out tonsils and pulled out teeth, even hauled out whole sections of the intestines. Each time they thought they had it. And then that fashion died out and another took its place till psychiatrists, weary of following these blind leads, became the most discouraged and cynical men on earth. The trouble with the biochemists was not, as with the anatomists, that they found nothing wrong, but that they found

too much. In the end the biochemists, too, admitted they were stalled.

The bacteriologists in the saddle. Since the discovery of bacteria, what diseases had not been conquered, what epidemics not stopped dead in their tracks! Then why not mental diseases? Bacteria boring into the brain, micro-organisms attacking the nervous system? The bacteriologists combed the body — and could find no germs which were causing mental diseases.

The endocrinologists swing into the breach. Brown-Séquard had started it when he treated acromegaly with animal glandular extracts. Kraepelin, thirteen years before Abel first isolated the active principle of a gland, had hopefully administered to his insane patients extracts of every known gland. And now the endocrinologists advised giving the newly discovered active principles of the glands, and the doctors found that, yes, when they gave glandular extracts to schizophrenics who had thyroid deficiencies, some of them got well. But then so few schizophrenics have thyroid deficiencies! So that attack, too, failed.

The long-suffering bedside men plodded hopefully in the wake of each of these "discoveries" as it came along. They fed their patients glandular extracts, sloshed out sinuses, operated on colons said to be awash with the bacteria of insanity — and didn't budge their psychoses an inch. It began to look as though the physiological school were beaten — done for — finished. They had searched the body from stem to stern and still the "disease process" which they insisted was at the bottom of every mental disorder eluded them. If it was there, no technique yet devised by man could detect it.

But the more they failed, the more besotted in their monomania did these fanatics become. Yield an inch to the psychological boys? You don't know an organicist! They were steadily losing ground but, like the British, defeat only toughened them. They had the most sublime conviction of their rightness and their ultimate victory. Time was all they asked for.

"Mind cannot be diseased," they insisted. "All disease is physical. Give us time and we'll prove it."

Meantime, in the enemy camp, an ominous activity and fan-

fare had broken out. Drums were beating, bugles blowing, and great preparations for a fresh onslaught on the already weary troops of Kraepelin were under way. And under what leadership! — as we shall see in a moment.

Though he were to be shot for it, Kraepelin would never for a moment have admitted the possibility of the psychological origin of mental disease. Let all who would salute the new flag raised over the enemy camp, he, Kraepelin, would go down fighting.

And then an unforeseeable thing happened.

The First World War broke out. The medical sensation of that war was not, as we have seen, the prodigies of surgery, but the miracles performed for the victims of that new disorder called shell shock by the men from Bedlam.

In the army hospitals the doctors and surgeons, impressed, as they couldn't help being, by this new treatment (which was saving thousands of perfectly sound limbs from being sawed off and chucked into slop pails), began asking questions.

"Sick in their minds, eh?" they inquired. "But how the devil — ? Mind can't be diseased."

"What do you mean 'mind cannot be diseased'?" the new men answered them. "Listen." And they quoted McDougall, a chap in charge of the Netley Hospital where the British Army was sending its mental cases from all over the world.

"Mind," they quoted him, "has a nature and a structure and functions of its own which cannot be adequately described in terms of the brain and its processes."

Those dyed-in-the-wool organicists like Kraepelin, they intimated, had better revise their thinking a bit to admit certain new facts. They hadn't produced the proof, had they, that mental disorder was always rooted in physiological disease, not with all their dissections and stainings and fishing in cultures? But *we have* found causes — and they're in the mind. Take that case yesterday . . .

As long as you'd listen, they'd talk about this new "science" of theirs and about the genius who had developed it, and this is what they'd say . . .

## VIII

# *The Three Grand Old Men*

EVER hear of a chap named Janet?" this young psychiatrist might ask the army doctor. "No? No, I don't suppose you would have. Ever hear of a fellow named Braid? No. Nor Bernheim? Nor Liébeault? Nor Breuer? No. And of course you never heard of a man named Freud?"

No, he'd never heard of a man named Freud.

"Then all this is going to be a bit difficult to explain. It all goes back to an old boy of the time of the French Revolution, Mesmer — you've heard of *him* — who discovered something he called animal magnetism but which was really a kind of hypnotism. The point is that it was a way of getting at nervous disorders through the mind. It developed gradually into hypnotism and suggestion and persuasion, all of which were good up to a certain point but they never got at the root of the trouble. No one, not the best of them, was ever able to trace these disorders back to their source until along comes this man Freud. Now Freud —"

Perhaps this young doctor did not say, but some of Freud's disciples did, "Yes, one man is God — Freud." But certainly he could not have been blamed if he had claimed that the Austrian had made the greatest single contribution to psychology any man has ever made. McDougall, himself founder of a great school of psychology, has said that it is the greatest contribution since Aristotle. Another authority calls it the most significant development in psychotherapy in all its seven thousand years. Still another ranks it among the greatest achievements of humanity.

It took over a century and many minds to develop the fundamental principles of hypnotism. But one man, in a few decades, created the whole science of psychoanalysis from beginning to end, in comparison with which hypnotism is a simple, obvious conception. Even if it isn't all true, even if only a small part of it is true, it's still magnificent.

"What sort of chap is this Freud?" the army doctor asks the young psychiatrist.

"It's all according to whom you ask. I've heard chaps who have heard him talk say, 'It's like listening to Jove.' I've heard others say, 'A Jew with an inferiority complex.' Some call his indifference to public opinion arrogance, some call it a godlike detachment. Some say he never lost an enemy or made a friend. They say he's broken with every follower the minute he refused to accept his every word as gospel. One thing is sure — he's given us the best psychological method of getting at the mind, normal or abnormal, that's ever been discovered. Say, listen — "

It started in Vienna, in the city from which Mesmer was banished and which, in all the intervening years, had never opened its doors to hypnotism. The work of Liébeault and Bernheim and Charcot made no impression on the Viennese medicos. Hypnotism was altogether too mystical for their taste. So when a young doctor named Sigmund Freud returned from Paris after studying with Charcot and later from Nancy after observing the cures of its two famous suggestionists, and announced that here was a way far better than baths and rest and electrical stimulation to treat nervous disorders, they merely shrugged and went right on administering pink pills and large doses of contempt to their nervous patients with whom, anyway, they were terribly bored. And when he announced that hysteria was not confined exclusively to women but that he'd actually seen male hysterics in Paris, they clapped their thighs and roared. For "hysteria" is from the Greek word meaning womb and *by definition* is a female ailment.

But already Freud had developed the knack of not hearing such laughter and pigheadedly continuing to think his own

thoughts. He found he got further by treating his nervous or hysterical patients by hypnotism than by putting them to bed and pampering them or, as did the majority of doctors, by packing them off to some distant "rest cure" where they'd never hear from them again — they hoped.

So he continued with hypnotism until one day something happened which gave him the idea he was to spend his life developing into the most original psychological doctrine ever conceived — never, however, it must be emphasized, turning his back upon biology.

One day a fellow practitioner, a Dr. Breuer, whose theories had been influential in drawing Freud back to Vienna and who also was deeply interested in hysteria and hypnosis, related to Freud a curious case of his. (They were always exchanging case histories, these two — were collaborators really.) In treating a certain woman patient by hypnotism, it seemed to Breuer that he had stumbled upon the possible cause of her hysterical symptom, a paralyzed arm.

Under hypnosis this girl recalled, with considerable anguish, a very painful episode in her life. Encouraging her to talk of it freely, Dr. Breuer was amazed to find that the more she talked the better she felt, till at last she had completely "talked out" the effect of the emotional wound which had produced the paralyzed arm. In her waking life she had no recollection of this unhappy experience, but that it was not forgotten was proved by the fact that it could be recalled under hypnosis. Where then was it in the interim? And why could it not be recalled in the waking state? And how in the first place could such an important event have been forgotten?

"Freud," someone has said, "missed his career. He should have been a detective."

No, he didn't miss it. At that moment he *became* a detective, the first and greatest of the psychological detectives. Given the faintest psychological footprint, speck of cigarette ash, blood-stain, nail scraping, hair, Freud could track a neurosis to its hideout and lay it by the heels.

Now, with the start Breuer has given him, he is on the

trail of a criminal whose existence even has never been suspected. For fifty years he will be on this trail, building up such a case against him that, though the evidence is admittedly circumstantial, he stands convicted today of a staggering list of crimes against humanity.

That criminal is the unconscious.

Where, Freud began, did memories unacceptable to the conscious mind go when they were repressed? Perhaps into the subconscious. Janet had postulated a subconscious consisting of isolated bits of consciousness broken off because of a predisposition to hysteria.

No, said Freud, this subconscious mind is something quite different. The unconscious, as he preferred to call it, is a storehouse of memories which were forced into oblivion because they were too painful, too wounding to the ego, to be tolerated in consciousness. These memories continue to exist in the unconscious and frequently reappear as a hysterical symptom — a paralyzed arm, for example. Such a memory, in a word, is often *converted* into a symptom. An idea thus becomes an illness.

This first declaration of his, that an idea may produce a bodily symptom, merely released medical snorts and chortles, but the next had such an ugly look to it that mirth changed to indignation.

He stated that in *all* his cases he found that it wasn't just *any* repressed emotion which brought on a neurotic symptom; it was invariably a sexual emotion — and he publicly named names and described vices which heretofore had found a place only in medical literature. What happens, he explained, is something like this: —

A man has a compulsion to be always washing his hands. How did he come by this odd notion that, in spite of constant washing, his hands are always dirty? Thus: He has long been repressing the shameful memory that in adolescence he yielded to manual masturbation. His ego, unable to face such a degrading thought, gradually forced it into the unconscious, leaving only the feeling that somehow his hands were unclean.

With this announcement the war between Freud and the medical profession, which still rages, broke out. For this, said the doctors, was not only a silly presumption, without scientific proof, it was a very nasty reflection on human nature.

But opposition never halted Freud. This was merely his opening gun. From now on what he had to say concerning human nature became steadily more unacceptable. Not only hysterics, he now imperturbably continued, with their overt symptoms obviously needing medical attention, but many apparently normal people, because of unsatisfied sexual desires, develop neurotic symptoms. They build up a sexual tension which manifests itself as anxiety, apprehension, and extreme nervousness. This state breeds phobias, compulsions, and frequently even more disabling symptoms.

This was striking at the very roots of religion and morality. The worst of it was that this man Freud, talking Sex from a soapbox, had caught the popular fancy. Not only were these ideas of his fascinating and exciting, they had an all too plausible sound.

So the doctors swung into action. They denounced Freud on scientific as well as ethical grounds. Where, for example, they demanded, was his proof of the existence of this famous unconscious of his?

Freud, attacked, always advanced. Now, instead of unsaying one word he had said concerning the prevalence of sex abnormalities, pausing only to reply to his attackers that the proof of the unconscious was the phenomenon of posthypnotic suggestion, he went on to announce further and more revolting discoveries concerning the sexual nature of man. But before we come to that . . .

Freud, working always alone in his little office in Vienna (all his life he lived and practised in one modest little apartment after another, sometimes located over a butcher or grocery shop, always in a poor section of town), had been developing new methods of getting at this unconscious, whose existence was the foundation of his psychology. Hypnotism had its limitations. For one thing, it made and kept the patient too

dependent upon his physician, whereas, according to Freud, his recovery depended upon his ability to develop his own inner resources and make a fight for it himself.

Freud now began to devise a substitute for hypnotism, a psychological trap for the unconscious. Instead of hypnotizing his patient, he asked him to lie on a couch, to relax, to permit his mind to wander. He himself sat, out of sight, at the head of the couch. He described what follows thus: —

The patient talks, tells of his past experiences and present impressions, complains, and expresses his wishes and emotions. The physician listens, attempts to direct the patient's thought processes, reminds him, forces his attention in certain directions, gives him explanations and observes the reactions of understanding or denial thus evoked. . . . The patient will make the communications necessary to the analysis only under the conditions of a special affective relationship to the physician.

Sometimes, for the entire hour that this session lasted, Freud uttered scarcely a word. It was the patient, in this office, who did the talking. It was not a consultation — it was a confession.

This mental rambling, he discovered, is an excellent way to catch the mind off guard and to release the unconscious. Gradually, over a period of months, a person will pour out all sorts of repressed memories and eventually, to the trained observer, will reveal the psychic trauma, or wound, which brought on his symptoms. When, with all its original painful emotion, the forgotten episode has been recalled, the patient is in a position to free himself from his sense of guilt or fear or anxiety or inferiority and so regain his mental and physical health.

This technique, utterly different from anything that had gone before, Freud called psychoanalysis. For the first time in the history of psychological medicine, a way had been found to get at the *cause* of mental abnormalities, not merely to lop off symptoms.

Naturally, in the beginning, this technique was a crude tool, but gradually Freud developed methods of evoking the repressed material in the unconscious that were uncannily clever. What the lie detector, analysis of blood types, ballistics, and

fingerprinting are to the police detective, Free Association, Dream Analysis, and the Interpretation of Word Slips, methods which Freud invented to trap the unconscious, are to the psychoanalyst.

Dreams — what had they ever been to doctors but evidence of overindulgence and the need of bicarbonate of soda? To Freud, to whom the dream was the expression of a repressed wish, it became “the royal road to the unconscious.” Desires suppressed during the day are fulfilled at night. Our dreams are grotesque and puzzling because these wishes dare not openly appear for what they are (even in his dreams a man may hesitate to possess himself of his brother’s wife) but come in disguise, with strange settings and symbolic trappings. The moral censor, our Super-Ego, does not sleep at night; he merely nods. The unconscious seizes this opportunity to indulge its sexual and aggressive drives, but it must mask them to get by the nodding censor. So we sin in symbols.

As thus: steeples, pistols, pistons, and the like, in dreams represent the male sex organ. Hills, vessels, boxes, symbolize the female sex organs. Flying, floating upstairs, riding swiftly in cars or trains express the sex act.

Ask your patient to relate his dreams, consider them in terms of his emotional needs, translating their symbolic language and taking your cue from his “free associations” while relating them, and you are in a position to interpret them. They will be found to reveal his repressed desires, for dreams are wish fulfillments. Thus, tracking down dream after dream, you will finally come upon that psychic wound which is producing his symptoms.

And then word slips. Sometimes in conversation the mechanics of the mind slip a cog, an unintended word is uttered, and, “Caught!” cries the psychoanalyst. When you say what you had not meant to say, you are saying what you really wanted to say. The unconscious has taken advantage of a temporary lapse on the part of the conscious mind to voice its suppressed desires and so betrays itself — as when a domineering woman says, “When my husband asked about his diet, his doctor told

him he should eat whatever *I* please," or when a German newspaper reports, "Among those present was His Highness, the Clown Prince."

"Free Association" is the name given by Freud to the rambling monologue of the patient in the doctor's office who voluntarily relinquishes the usual censorships of conversation — logic, reason, good taste, moral and social inhibitions. It leads on from one event to the next merely by association. By its leading so often to the same event, the psychoanalyst is given a clue as to where the painful episode lies buried.

These were the psychological keys Freud invented to help the patient in opening the doors to his unconscious mind, for to this doctor his patient is a collaborator. Now to return to what, by these means, he discovered in this hitherto unvisited land.

Examining patient after patient, he gradually became convinced that the neuroses invariably had their origin in some sexual episode of adolescence. That was sufficiently unpleasant but worse was to come. As he went on he discovered (and Freud, a respectable, middle-class husband and father, was quite as much startled by this as any Mr. Barrett of Wimpole Street) that these psychic wounds often antedated even adolescence, having their roots far back in childhood.

In proof of this shocking statement Freud reported that it was not uncommon for a female patient to recall the memory of an attempted seduction in early childhood and usually the would-be seducer was her father or older brother. (With male patients it was a nursemaid.) But, Freud reasoned, not possibly could there be the number of depraved fathers and brothers thus reported. There must be some other explanation. . . .

And one day he came upon it. These seduction scenes were not memories at all. They had never occurred. They were, in fact, pure fantasy. The patient recalled them as actual occurrences but in reality they represented the wish fulfillment of the child, who desired this sort of relation with parent or brother.

This, it must be admitted, even after half a century of ex-

posure to Freudian doctrines, is a revolting idea. It made a decent human being sick to his stomach from nothing he had eaten. But Freud pursued it relentlessly, turning up even more distasteful theories.

The child, even the infant, he proclaimed, has a rich sexual life. Not in adolescence, as heretofore believed, does sex begin to stir, but back in the cradle in the frank and free play of the infant with its sex organs, its unmistakable sensuality, its overt delight in all its physical processes. Its whole life is centered in its own body and the gratification of its physical desires. Himself and his mother, until about the age of two, are his whole world.

Then his attention is turned outward, to father, to brothers and sisters, but his curiosity concerning sex only increases. Their differences from himself, the whys and hows of every physical act and function, bring an avalanche of questions, and the hush-hush campaign of his elders begins. He gradually gets the idea that such subjects are taboo, and the less thought about them the better. He is now six.

He has learned the first lesson of society — repression. He is not less curious, he is only more silent. Nothing is forgotten, it merely retreats into the unconscious.

More. The child, tied by a strongly sexual bond to his mother, develops a resentment of his father, whose privileges he covets. But the father is a superior being, greatly to be feared, one who metes out punishment for prohibited acts. In the history of the race, there has always been this fear of the Old Man of the Tribe, and with those who sexually offended it was often, quite simply, the fear of injury to the sexual organs. So Freud gave the name *castration fear* to the boy's apprehension of the father's disapproval. This father-fear is a very real element in the lives of most boys, even the good boys of good fathers, and if the boy does not, at the proper time, outgrow it, it may cause a neurosis. It may develop into a feeling of anxiety, which is fear without a definite basis, one of the commonest symptoms of nervous patients.

Yet at the same time the small boy admires his father, wishes

to emulate him, and frequently *identifies* himself with him. He imitates him, believes he looks and acts like him, assumes his place when he is away, blows himself up in his imagination till he is convinced he can do anything his father can do. Love and hate then exist side by side? Of course — in what love affair do they not? If the child fails to find a solution for these emotional problems, they lead to that constant morbid indecision which is the mark of every neurotic. So the aim of every psychoanalytic treatment becomes to resolve the patient's inner conflict and so enable him to emerge from the childhood stage at which his emotional life has been arrested and progress to a normal adult stage. This emotional situation, which he announced exists in the life of every child, is the cornerstone of Freud's psychology of the unconscious.

Freud had an uncanny flair for the word that would sell his idea. But for this gift for coining the perfect phrase his psychology would scarcely have attained its enormous popularity. Take *narcissism* — the love of the child for its own body; *conversion* — the transformation of a repressed memory into a hysterical symptom; *catharsis* — the mental purging that comes with the outpouring of these repressed memories; *sublimation* — "the exchange of infantile sexual aims for interests or modes of pleasure-finding which are no longer directly sexual, although psychically related, and which are on a higher social level"; *transference* — the unconscious attachment of the patient to his doctor which is a necessary part of the psychoanalytic treatment, the logical conclusion to Mesmer's idea of rapport; and *flight from reality*, *fixation*, *castration fear*, *pleasure-principle*, *super-ego*, *libido* — each one an advertising slogan.

And now, to describe this attitude of the boy to the first triangle situation in his life — himself as the rival of his father for his mother's love — he chose the fascinating phrase *Oedipus complex*. Who that knows the great Greek tragedy of Oedipus, the son who, not knowing his relationship, slew his own father and married his own mother, can fail to fill this term with all the significance Freud intended? For its companion situation, that of the girl who harbors an unconscious erotic attachment

to her father, he took, from another Greek tragedy, the phrase *Electra complex*.

It is Freud's gift that, as he reveals these situations and these facts concerning child psychology, we recognize their verisimilitude. These things, it seems, have always existed, right under our noses, and no one has ever seen them before. Acknowledging them, we have a plausible and coherent explanation of much that was never understood. Now we can understand the preference of girls for their fathers, the frequent antagonism between fathers and sons, and the greater devotion of boys to their mothers, all based on this early sexual bond but gradually *sublimated* into something higher.

The psychiatrist who must deal with the warped mind has now a brilliant light by which to explore its dark labyrinths. Freud proclaimed that the neuroses have their roots in the sexual instinct, which, driven from consciousness by the taboos of society, takes refuge in the unconscious, later to force its way back to consciousness as obsessions, compulsions, and other neurotic symptoms. Case after case, to the number of thousands, he analyzed, and found always that the cause of the neurosis was sexual frustration, either the unrelieved sexual tensions of adult life or the repression of sexual fantasy in childhood.

To be a normal human being, Freud said, an individual must, at the proper time, pass emotionally from an earlier to a later stage of sexual development. If he lingers mentally in one stage while physically he has advanced to another, neurosis is the result.

With such neurotic personalities the psychiatrist is daily faced.

Here is a woman passionately fond of dress, adoring jewels, tending her body as though it were a shrine, refusing to have children, ostensibly because her doctor advises against it, actually because she fears to spoil her figure. What is wrong? She has never moved on from that period of childhood when the love of the body is the paramount concern, the period of narcissism, natural and normal then, unnatural now.

Here is a man who is meticulous in his dress, a stickler for the conventions, a bachelor who lives alone with a motherly old housekeeper to look after him, observes a strict diet, takes his weight every morning, his temperature every night, sees his dentist once a month, his doctor once a week. The trouble? He lingers in the infantile stage when infatuation with one's self, interest in one's bodily functions, and the delight of being tended by one's mother were the great satisfactions in life.

How many men, never get beyond being overgrown school-boys, football heroes, naughty adolescents! How many women never advance beyond being daddy's darling, little princesses, rebellious daughters, woman haters! And later on we'll see how those whose deterioration has gone further, in their illness regress to even earlier stages, to the point actually where they must be fed, as their mothers fed them.

This then is the cornerstone of Freudian psychology, the sexual theory of the neuroses. Freud did not invent it; he merely discovered it.

You can see how such doctrines would shake psychology and, since psychoanalysis professed to be a method of treatment for neurotic disorders as well as a theory of human conduct, medicine likewise to their very foundations, the more so as the public, which can usually take its psychology or let it alone, was so vastly intrigued with this new sex psychology that it stampered the offices of the psychoanalysts, paying an almost religious homage to its most glamorous practitioners.

There was nothing to do but to blast psychoanalysis root, branch, and leaf. Which is what the medical profession proceeded to do. Exactly the same charges were brought against it as against mesmerism. It was unscientific, immoral, and obscene.

Three things especially the doctors resented: the idea that childhood is riddled with sex and that the most irreproachable human beings harbor perverse sexual desires; the notion that the same mental mechanisms which Freud claimed to have found in the neurotic were at work as well in normal individuals and in the insane (where, being on the surface, they were clearly visible); and the fees that these new men raked in.

They still resent these things but most psychiatrists today accept some of the fundamentals of Freud's psychology — for example, the influence of the unconscious on the behavior of human beings, normal and abnormal. That arch criminal, which Freud was a lifetime tracking down, today stands convicted of most of the sins of humanity, though it is equally, of course, the source of love and conscience. Before Freud, psychology took into account not much more of mind than appeared on the surface and was readily explained. After Freud, consciousness was recognized as being only a small part of mind, fairly unimportant in motivating our conduct. Not reason, but the dynamic energy of the unconscious was seen to be what usually initiates our acts. For in the unconscious is stored not only our personal past but the biological past of the race, the primitive drives which are as much more powerful than reason as a jungle tiger is than an unarmed man.

Not all this, of course, was known to the young psychiatrist who at the beginning of this chapter was explaining psychoanalysis to the army doctor back in 1914. Freud then had another twenty-six years to live and work on the science which he regarded as his by right of discovery. He died, a refugee in England, in 1940, greatly honored and greatly scorned. To the majority of psychiatrists, though he was a genius, he still had a forked tail. In 1937 Freud himself said: —

"Nowadays it is the fashion to say, 'Freud is a genius. Of course, his theory of the unconscious is absurd, his dream analysis is farfetched, his whole psychology is fantastic.' What then makes me a genius? It would be more intelligent to say Freud is a genius *because* he discovered the unconscious, *because* he discovered how to interpret dreams, *because* he built up a whole new psychology. What they are still trying to do is to destroy me, this time under cover of flattery."

Many psychiatrists, while accepting his theory of the unconscious, are still unable to swallow his doctrine of pansexuality. Filthy, vile, obscene are still the words they apply to it. But —

"Without processes having their origin in sexual life the

greater part of human activity would cease," Freud said, and, "At the bottom of every neurosis is a sex conflict."

That was too much even for some of his faithful followers.

"I don't find it so," said one of the cleverest of these, Alfred Adler. "I simply don't find it so. Instead I find a quite different force at work."

Starting as a co-worker of Freud's, accepting his doctrine of psychoanalysis, Adler eventually broke with him — and on this very point of pansexuality. Perhaps we can best state his position by presenting in an imaginary conversation between the two men the theories developed over a period of years. Similar conversations, in their Viennese days together, we know took place, preceding the open break.

"This 'different force' you find at work," we may picture Freud as asking Adler, "what is it?"

"The will to dominate," answers Adler. "The desire to be important. I think that, at the very core of every human being, is the unshakable desire to be Somebody. Even in the most negligible people, the last lowest dregs of humanity, I find this indomitable will to power. A hunchback bootblack has it equally with a prime minister. Yes. Only the other day I had a young lad, a puny little fellow, tell me that he had made a high jump of ten feet two inches. Now the world's record is just over six feet, so — ! But he wasn't lying. It was an extraordinarily vivid dream he'd had. You see, because of his physical inferiority, he *had* to excel in fantasy. The urge to be important."

"Naturally. But have you gone deep enough into the unconscious? We strive to excel, certainly, but why? Exhibitionism based on sex rivalry for the purpose of winning a mate. The plumage of the peacock, the song of the nightingale. You see it comes down to sex in the end," nods Freud.

"No, I don't think so," says Adler slowly. "I don't believe the Oedipus complex and its transference from one object to another is our only motivation. I don't even know that I believe it is the most important. I am beginning to think that incestuous feeling is not the keynote to all neurotic disorders."

"Because you have a moral disgust for the idea."

"Not entirely. It no longer satisfies me to say that this inborn incestuous desire is the root of our universal sense of guilt and therefore the basis of morality and religion. The idea that children harbor an innate love for the parent of the opposite sex and of hate for the parent of the same sex, flies in the face of experience and common sense. When it exists, I think it more likely that it is unconsciously fostered by the parents. I find much evidence of other drives, equally strong."

"Such as?"

"The aggressive instincts. The primitive, ruthless drive to power. That, too, we have forced down into the unconscious. It isn't socially acceptable. On the whole we don't admit it even to ourselves, any more than we admit incestuous love. But I find it a more universal motive than sex. It is a corollary of the struggle for life and the survival of the fittest. It is the inner conflict between this self-assertive drive and the repressive forces of morality and society that engenders the neuroses."

"You really believe that? You've got hold of a very popular notion there. It will go down a great deal better than my ideas. You should be popular — and you like that."

"Yes, I like to be liked," says Adler slowly. "I like people. I don't think you do."

Freud shrugs.

"Why should I love my neighbor?"

The quarrel became bitter. Finally the two men broke. Adler came to America where, as Freud had prophesied, his ideas became very popular.

That Freud later modified certain of his doctrines did not prevent his bitterly resenting each new theory as it came up. Naturally it seemed to him that Freud knew best.

Adler went on to develop what he called Individual Psychology, based on psychoanalysis but differing from it widely. For one thing, he was as much interested in helping those normal yet unhappy human beings who are merely frustrated and unfulfilled as in treating the frankly ill. This spread his doctrine over a wider area and gave it a more popular appeal.

He, too, was a slogan-maker: Who today does not babble of inferiority complexes, compensation and over-compensation, the masculine protest, the feminine protest, the will-to-power, evasions and escape mechanisms? These are Adler's contributions, and they are on every tongue.

Not long ago I heard Elsa Maxwell, the party-givingest woman who ever lived, say, "I just have to give parties — the biggest, most exciting, most talked-of parties in the world. Parties attended by kings and queens, parties to which the most important people in Europe and America beg to be invited. Why? Because as a child I lived on the wrong side of the tracks, because my parents and I were never invited to the parties of the people who lived on the right side of the tracks.

"I am a 'funny' woman. *Why* is a funny woman? Because she is a fat woman or a homely woman. I had to be very, very funny to make up for *my* fatness and plainness. In a word, it is the good old inferiority complex at work."

We are born with a feeling of superiority, says Adler. All our lives we strive to obtain an acknowledgment of this superiority from others. We are surrounded by people who seek to prove the contrary. As infants we are inferior to those around us, in size, in strength, in ability. All society, as we grow older, is in league to make us feel this inferiority. If it succeeds, we take refuge in fantasy, imagining situations which fulfill our need to be important. We withdraw more and more from harsh reality, feed ourselves on daydreams, seek the company of inferiors, dull our pain with liquor or dope. We are neurotic.

Or again: it is not always outside forces which fasten this feeling of inadequacy upon us; it is sometimes an actual bodily defect to which we cannot possibly close our eyes — a squint, a clubfoot, a dwarfishness, a stammer, or just the color of our hair or the size of our nose. Whatever it is, we hate it; we can't tolerate this wound to our vanity. We start, in childhood, a campaign to overcome it.

Nana Gollner, one of the leading ballet dancers in the world, had infantile paralysis. Ted Shawn became a great dancer because he had post-diphtheritic paralysis. President Roosevelt

had infantile paralysis. They say that the will that can overcome that handicap can achieve anything.

Glenn Cunningham became a great runner because as a boy he was so terribly burned that it was thought he would be a cripple. Winston Churchill is a great orator because he had a lisp. Dr. Trudeau founded the sanatorium for tuberculosis at Saranac because he was consumptive. Joan Crawford and Katherine Cornell confess they were driven to seek fame in the theater because they were ugly ducklings.

Every human being, says Adler, has a goal in life. Without a goal we can't think, feel, will, or act. In order to achieve this goal we devise, perhaps unconsciously, a life plan. Goal and plan are vague in childhood but become better defined in adult life. All our efforts are bent toward achieving this goal, which is chosen as a means of compensating for our inferiority, bodily or social, and of establishing our superiority. If it is a worthy goal, successfully pursued, we become well-adjusted human beings. But if it is an antisocial goal, involving inner conflict, unhappiness and neurosis are our lot.

As an example of a bodily handicap successfully compensated for, I think of no better example than that of a certain Matthew Fontaine Maury, who lived about one hundred years ago.

One day the naval authorities of the United States sat worrying about a certain ship long overdue and believed lost. A young chap doing "paper work" went to his senior officer and said, "Sir, I believe if you would send a ship to latitude so-and-so, longitude so-and-so, you might find the lost ship and possibly the survivors."

Where in heaven's name, his chief demanded, did he get so fantastic a notion — a revelation?

No, sir, it was a matter of computation. You see, sir, when last reported, four days ago, she was in such-and-such a position. At this time of year, in that area, the winds blow in such a direction, the tides —

But, good Lord, did the fellow think there was any *law* about these things?

Yes, the fellow decidedly thought there was a law.

"You see, sir, looking over all these weather reports and charts of ships at sea, which at first seemed so fearfully dull, I one day came across the report of a ship which had been in exactly the same spot as *I* had been just a year previous — and the weather conditions, winds, currents, were exactly the same on both occasions. That set me to thinking, sir — "

"Pure coincidence."

" — that there might be such things as *prevailing* winds, laws for these elements. If that were so — "

"Ridiculous! Against God and nature!"

"But since there's nothing else you can do, sir — "

Since there really *was* nothing else they could do, they did send a ship. And there, at the exact spot the young screw-ball had indicated, they picked up the survivors of the lost ship.

That was how Maury became the father of the Weather Bureau and compensated for a handicap that had prevented his achieving his original goal. For you see young Maury had meant to be a naval commander, had studied and fitted himself for that job, and then one day, when he was still only a petty officer, he had been crippled in an accident — and good-by career.

So they gave him a berth in an office on shore where he ate his heart out following the courses of ships he wasn't on. Until one day that screwy idea struck him and he began drawing up the first nautical charts of trade winds and currents ever made. . . . Sometimes the compensation we make for an inferiority is elliptical.

Thus Adler substituted for Freud's sex drive the drive for power as the underlying motive of our activities. On this foundation he worked out a shorter, more practical method of treatment. People were not interested, he held, in the complicated structure of their unconscious life. They asked only for relief from their unhappiness, from the fears and feelings of inferiority that tortured them. This could be quickly given by teaching them the uselessness of their efforts to evade the issues they feared to face and by helping them to trace back

to their childhood the antisocial tendencies which had precipitated their neuroses.

With the ugly sex angle of Freudian psychoanalysis played down and an easily understandable, less "deep," less subtle psychology substituted, "individual psychology" attained a wide popularity. But in spite of their many differences, both men — and this is of the greatest importance — placed all their emphasis on the *emotional* rather than the intellectual side of man. In the depths of the unconscious, they insisted, where live all those dark, primitive drives we inherit from savage ancestors, are to be found the motives of our conduct, not in our lofty intellects. Studying scientifically for the first time the emotionally involved, frustrated individual struggling against a hostile world, these two men brought to light the emotional basis of his difficulties. This emphasis on emotion is new in the study of mind.

Adler had soft-pedaled the Sex Drive and accented the Drive for Power, less revolting but still not a pretty sight. (Both these men certainly knew what a human being really looks like on the inside, God help them.) And now another professor of psychoanalysis broke away from the Freudian school because of its insistence on sex and started a new movement emphasizing still another side of many-sided human nature. With his Analytical Psychology, he spread psychiatry out to cover a wider circle of people than even Adler had done. Freud concentrated on neurotics, Adler extended his treatment to include unhappy, frustrated human beings, but Jung said everyone, even fairly happy people, seemingly well-adjusted, with a satisfactory sex life, needed the help of a trained psychologist. Why?

Because there is something in man, he said, that reaches beyond his material needs, something truly spiritual which can be expressed only by the word "soul." Sex and the drive for power, yes, but also something higher, stirring in the lowliest, which pulls us upward toward goals we can't even define. These "creative stirrings" soar beyond our primitive instincts and their gratification.

Yes, there is a religious element in Jung's psychology — he

was the son of a Swiss minister. But he was no mere idealistic theorist. This "soul" he postulated is as deeply imbedded in human nature as the sex drive itself. It stems from the creative energy in man, the life force, what the French had long called the *élan vital*. Go back as far as you will in the story of the race, you will find this instinctual energy expressing itself in other forms than sex and aggression. You will find it expressing itself in the burial of the dead (why?), in the prehistoric paintings and sculptures unearthed in the caves of southern Spain and northern Africa in which, 50,000 years ago, primitive man endeavored to express that inner striving toward beauty which racked him, and expressed it so well that seldom have the greatest artists of any period surpassed him.

So even though a man's physical nature may be satisfied, said Jung, he may yet not be a complete and happy human being. He must likewise fulfill these "creative strivings" of his, and here is where the psychoanalyst can step in and help. He can disclose to him spiritual strivings of which he may be unconscious, and show him how he can satisfy them.

As Hughlings Jackson applied Darwinism to the study of the brain, Jung now applied it to the study of the mind. Man's unconscious memory extended farther back than his own infancy, he said. It went far back into the past of the race.

Take your neurotic. When the emotional (sex) energy of a human being failed of its normal outlet, he regressed, according to Freud, to an earlier period of his life and became fixated at, say, the narcissistic stage. Ah no, said Jung, he regressed to the infancy of *the race*, to an archaic pattern of behavior which was once normal for an adult. He retreated not into his own unconscious, but into the collective unconscious. His own unconscious was the inheritor of the racial unconscious in which were laid down the primitive patterns of behavior of the ages. These racial tendencies to certain ways of thinking he called "archetypes."

For example: A man whose dreams betray, according to a Freudian analysis, a latent fear of his father, to Jung would betray rather a fear reaching far back into our racial history,

the fear of the tribal chief, a composite of all "the wise old men" who ever imposed their will on the young men of the tribe. For why, asks Jung, would these dominating figures in the unconscious of primitive man disappear any more than do the ancient brain mechanisms? And he used folklore and fairy tale and myth and religion to prove that these archetypes are not lost but persist in the archaic strata of the unconscious. Neurotic symptoms are therefore a reaction to these archetypes rather than to personal childhood episodes. The soldier in battle who dies with the word "Mother" on his lips means not so much his own personal mother as the Great Mother of the race, the archetype of life-giving, nourishing, protecting motherhood. From this point on Jung's theories dissolve into a mist of mysticism even more beyond the grasp of the layman than the psychological subtleties of Freud.

While the most mystical, philosophical, and moralizing of the psychoanalytical leaders, Jung was also a hardheaded, practical scientist with vast knowledge and a brilliant, investigating mind. He made a classical study of dementia praecox patients in which he showed that the delusions of these people, heretofore considered utterly meaningless, had a meaning which could be understood by those who would trace them to their psychological source and study the mental mechanisms involved. And these studies of abnormal mentalities, as always, threw much light on the normal mind.

He also invented a wonderful new psychological tool used today by most psychiatrists — his famous association-word test, a method which, for getting at the unconscious, stands beside the dream analysis of Freud.

What lurks in your unconscious? The examiner, stop watch in hand, pronounces a certain word. Without hesitation or reflection you mention the first word that comes to mind, the examiner jots it down together with the time lapse between his word and yours, pronounces another word to which you instantly respond, and so on through a long list. At the end he has a record of associations which give the clue to what goes on in your unconscious.

On this basis, various lists of provocative test words have been worked out. One such list of one hundred words supposed to touch buried complexes to the quick contains such words as *insult, kiss, bride, bed, woman, needle, swim, money, nasty*, and so on. To words having no emotional content the response is usually given in less than a second, but for these emotionally loaded words the usual time is 1.5 seconds, and if a word touches a painful complex the elapsed time will be longer, perhaps even five or six seconds, and the person may blush, stammer, or become restless. He does not wish to give the first word that leaps into mind so he hesitates, substitutes, and otherwise shows that an emotional complex has been touched. Thus the physician is enabled to explore the unconscious.

Jung himself was no mean coiner of phrases, a talent all three of these men possessed. It was he who contributed the word *complex*, than which no psychological expression comes more glibly to every tongue. He went on to typing us, and nothing flatters us more. Other psychologists have typed us — James as tough-minded and tender-minded; Kretschmer as cycloids and schizoids; the endocrinologists as thyroid personalities, pituitary and adrenal personalities; but none has ever typed us so much to our liking as Jung with his extroverts and introverts.

The extrovert, he said, is the outgoing person, who is interested in reality for its own sake. He wants to go everywhere and meet everyone, and would rather attend a hanging as the principal character than not at all. He loves a parade. He is a man of action. The introvert is introspective, tends to withdraw into himself, considers you, not from your point of view, but from his own, and sees events, not as something to be participated in, but to be controlled and made to serve him.

Out of all this what sort of treatment did Jung develop? For, after all, he was a doctor.

Holding that Freudian psychoanalysis entirely neglects the spiritual nature of man which has developed out of his instinctive drives and that this side of human nature could not be neglected without terrible consequences to the individual, Jung endeavored to make his patient see that his neurosis or

unhappiness was the result of misdirected unconscious energy and that he must redirect this energy, putting it behind worthy, creative, and constructive purposes rather than behind the undesirable and racially primitive ones on which he had become fixated. He must become one with all striving humanity.

"Moralizing," said the Freudians. "A doctor is not a clergyman; he is a scientist and a healer. This is the old Dubois preaching all over again. Drop the moral note and get down to psychology."

But in spite of such divisions as these with Jung and Adler, psychoanalysis made a magnificent contribution. At the close of the century, when the organicists were completely bogged down, when, search the body as they would, they could find no disease process, no bacteria, no toxins, *nothing* to account for the vast majority of mental disorders, the psychoanalysts came forward with their discovery of a new pathway to mind, one of the most illuminating psychological theories ever formulated.

Yes, at the turn of the century the psychological cohorts gained another brilliant victory. It looked, it really did, as though the psychoanalysts had proved their point — that in the mind (and specifically in the unconscious with its complexes, inhibitions, repressions, regressions, conflicts, drives) originate our mental disorders, psychoses as well as neuroses.

That was bad for the physiological camp. That was so bad it couldn't be worse. . . . Yes, one thing could be worse.

After the fall of France a famous French actor and wit came to America, Jean Gabin. Of course the reporters asked him, "And how do you in France feel about the British?"

Gabin replied, "Well, you see it's this way. We're both pro-British and anti-British. The pro-British pray every night, 'Please, God, give the gallant British a quick victory!' And the anti-British pray, 'Dear God, please let the dirty British win right away!'"

That's how it is with the psychological and physiological psychiatrists. Each side, hoping for its own victory in the war

on mental disorders, prays that, failing such a victory, the dirty opposition may win quickly.

So it might have been worse, but it was bad enough, that triumph of the psychoanalysts. Neurologists, biochemists, bacteriologists, pathologists, all had to take a back seat, step off the sidewalk for the psychoanalysts, walking high, wide, and handsome, and dragging down yearly incomes that looked like government appropriations.

It was defeat, bitter defeat. And then . . .

## IX

### *Fighting Fire with Fire*

GREGORY POST went to France with the A.E.F. in 1917 and came home after the Armistice with a disease previously incurable but then amenable to certain arsenical compounds. He took the routine treatment for syphilis and was pronounced cured.

So he had no hesitation a few years later about marrying and having children. From teller in a bank he rose, during fifteen years, to treasurer, becoming with every year a more solid citizen, owning his own home, belonging to the right clubs, sending his children to the best schools.

Then one morning when his wife was dressing to drive the children to school, he burst into the room, shouting, "Look here, why should you go on being chauffeur to this family? I've got enough money so my wife doesn't need to work — nor I either. I'll retire and we'll live on Easy Street, get a bigger place, a couple of cars, travel. Go anywhere we like — Hawaii, South America, Europe. And we'll go in our own yacht, too. I saw one advertized the other day for only half a million. I'll call up and order it. And I'll write you out a check for \$10,000 right now so you can get everything you and the children need. Here, give me my checkbook —"

His wife's first thought was that he had robbed the bank, but there were other things — a stumbling in his gait, a blurring of his speech, a trembling of his lips.

So she drove him to their doctor's. They were all day going about from doctor to doctor, it was a whole week of laboratory

tests and examinations before they knew for sure, but when they did know it was the worst news a doctor can give. . . . Paresis.

For fifteen years, not a sign. Not an ache, not a day in bed, not an unaccountable emotional outburst, not a slackening of intellectual powers—no, not even a lapse of memory. No warning.

Such is the way of the *Spirochaeta pallida* of syphilis, discovered by Schaudinn, which drills for years, silent, undetected, into the brain, leaving enough of the nervous tissues intact to support the fair façade of sanity while it undermines the whole structure. As short a time ago as 1905 that pale spirochete had never been seen, its existence never even suspected. So that what made men go mad in this particular way, slowly degenerating into imbecility, gradually losing control of the body in a creeping paralysis, no doctor had the vaguest notion.

Suppose we go back to that time. Suppose we go back even earlier—to a man sitting alone, reading, under an oil lamp in a stuffy little room in Vienna. It is 1885.

This man is tall and gangling and he sprawls. Chairs are never big enough for him and he never picks out a comfortable one. He has the unpressed look of an Abe Lincoln, he has his homely, hollowed face, his brooding eyes, his slouching, un-self-conscious awkwardness. Yes, he has an American look, yet he is a Viennese psychiatrist, with some sort of title of nobility—a *von* before his name, which he prefers to omit. He is a struggling young doctor now but even when he became famous, the head of the foremost psychiatric clinic in Austria, with medals clanking—yes, even the Nobel Prize—he remained a man who would never permit himself to be waited upon, a man who was his own secretary and his own servant, writing all his own letters, doing all his own errands.

Now, in this poor room, under a student's lamp, Julius Wagner-Jauregg sits reading an old medical book. At his elbow is a pile of these old volumes, their corners blunt, their pages brittle and yellow. One after the other he picks them up, reads a few pages, a whole chapter. He is at it all night.

And in the morning he has an idea.

Now look, he says to himself, Hippocrates tells of certain insane epileptics who caught malaria and came out of it cured of their insanity. In the Middle Ages a number of doctors noted that, after a bout of fever, the insane sometimes recovered their sanity. Then there is that account of an epidemic of cholera in a madhouse in France which killed off hundreds of the inmates but left a number completely sane. And this fellow Roess, in 1786, actually inoculated maniacs with smallpox and, so he claims, sometimes cured them. Around 1850 to 1860 we begin to get frequent reports of the insane recovering their wits, at least temporarily, after an attack of fever.

Well? Well, is this just old wives' tales to which no one but a fool would pay the slightest attention — or is it a clue which, if I follow it up, may put us on the track of a cure for insanity? (Since up to this moment there never had been a cure for insanity, this was a large question our young student was asking himself.)

No, it's fantastic, he thought. Fever, the ancient enemy of man, a cure for insanity! Fever a cure for anything! They say we psychiatrists have a strain of madness in us. Certainly this is as mad as anyone need be. Fever. What fever? There are dozens of fevers, most of them deadly. . . . For insanity? Which insanity? There are dozens of insanities, all of them incurable. . . . But say I could discover which fever for which insanity — then what? To whom am I going to give this famous fever? Who is going to authorize me to inoculate even a hopelessly insane man with, say, erysipelas or tuberculosis or malaria? What head of a clinic is going to tell me, "All right, go ahead, start an epidemic. Perhaps it will only kill off a few dozen of my insane patients. Of course, if it spreads beyond the hospital walls and most of Vienna comes down with it — ! Never mind, it's all in the interests of science. And no doubt you have a cure for the fever, too — such a clever young man." Just who is going to tell me that? And anyway, do I myself believe that these are anything but old wives' tales, just those coincidences which would be bound to occur in the course of three thousand years?

No, frankly, he had no great faith in this hunch of his. Still there it was, stuck fast in the back of his mind.

And then one day, in the clinic where he was an assistant, he sat beside an insane patient who was dying. She was dying of typhoid fever, and a good thing, too, for she had a long life of insanity before her. She slipped into coma, was almost gone, and then —

Suddenly he saw she was not going to die. He did what he could for her, knowing all the time it would be better if he didn't. And when she recovered and began to talk, it was neither the raving of insanity nor the delirium of fever. It was rational conversation. . . . With his own eyes he had seen one of these old wives' tales come true.

Later on there was another case — an insane woman who came down with erysipelas and immediately thereafter recovered her senses. Over a period of two years, there were a number of such cases, and sometimes it was typhus fever that did it and sometimes pneumonia and sometimes tuberculosis, and sometimes —

So now, though he was far from sure of anything, he thought it could do no harm to ask a medical question. So he wrote a report on these cases he'd seen with his own eyes and those old ones he'd read about and wound up by asking if there was anything to the idea of giving these fevering diseases to the insane.

This report aroused no storm of protest. It wasn't even read. So Wagner-Jauregg let the whole thing drop. That is, he let it drop as far as doing anything about it went. Nothing could prevent his thinking about it.

In 1927, when they were giving him the Nobel Prize, Wagner-Jauregg said: —

"In order to become famous, it isn't enough to be clever. One must also be lucky. One day in 1887 I was walking on a highway, carrying a small satchel. I grew tired and decided to drop the old bag, which held nothing of any value anyway. I left it there on the highway and went on.

"Exactly thirty years later I happened to be walking along that same highway and there, where I had dropped it, lay the

old satchel. Such a battered thing no one would bother to pick up. So I picked it up myself and, when I opened it, I saw that it contained a great treasure. That is what I mean by saying that it takes luck as well as cleverness to win fame."

Luck? . . .

For those thirty years, never relinquishing the notion that fever might drive out insanity, Wagner-Jauregg missed no opportunity to try out every sort of fever he could get hold of on every sort of insanity.

Erysipelas. As soon as the culture of that disease was discovered he began giving it to his insane patients. Instead of cures, he got a full-blown epidemic in the ward.

Tuberculosis. In 1890 the great Koch announced his new remedy for tuberculosis, a culture which he had concocted from the germs of that disease. So Wagner-Jauregg tried it on some of *his* patients. It produced fever all right but the fever didn't produce cures. Oh, some cases might have shown improvement but (and here the special demon of doctors, spontaneous recovery, leered from behind the bed) who was to say that these few patients might not have improved temporarily anyway?

There were other fevers, other attempts. Nothing very encouraging came of them. Perhaps tuberculin was the most promising . . . he didn't know.

And then he thought: Mightn't it be a good idea, instead of giving one of these cultures, say tuberculin, indiscriminately, to confine it to one class of the insane? That would still be shooting in the dark, of course, for the cause of most of the insanities was not known, but at least it would be shooting at a definite target.

All right. Which insanity?

Well, how about paresis? They knew more about paresis than about other mental disorders. True, they didn't know the cause. Syphilis was suspected but as late as 1892 a famous authority gave fourteen other possible causes. Even Kraepelin considered alcohol an essential factor. Still some things about this disease they did know.

First of all, they knew that it was absolutely incurable and inevitably ended in death (which set it apart from other insanities) in a maximum of five years. During those years the patient gradually deteriorated, winding up in imbecility. The course of this progressive mental *dégringolade* was marked by strokes, convulsions, ataxia, speech defects, and creeping paralysis till at the the final curtain no movement whatever was possible. A strange type of paralysis, seeming to be due to lack of nervous co-ordination rather than to any nerve deficiency, as though the victim had simply *forgotten* how to move.

On the mental side, what was the picture? It was held that a paretic was invariably a megalomaniac, harboring delusions of grandeur and having a general feeling of well-being and exhilaration. This, it later turned out, was quite incorrect. He *may* be like that, but equally he may be depressed and have the homicidal and suicidal impulses of the manic-depressive patient or the persecution complexes of the paranoiac.

The only encouraging feature of the whole picture to Wagner-Jauregg was that paresis was fatal. That meant, don't you see, that if you got even *one* victim past his five-year limit, stopped his deterioration dead in its tracks — you'd won! Because it had never been done before! Also you weren't taking a chance of killing a chap who, but for you, might have lived to a ripe old age.

So he decided, from now on, to confine his fevering treatments to paretics, and his cultures to tuberculin. In 1900 he began these experiments. In 1905 he made his report — and it looked as though he had really gotten somewhere this time. About 15 per cent had shown improvement, some of them had even returned home, taken up their old jobs, and, at the end of their allotted five years, were still alive. Of course this was probably only a temporary remission. Any day now they might show up at the asylum, whacky as ever. Still —

But the medical profession wasn't impressed. Just another one of those futile experiments someone was always announcing. You might as well admit it — insanity was incurable. Especially paresis,

So Wagner-Jauregg went right on trying to imitate Nature — to produce artificially the beneficent sort of fever with which she sometimes wiped out insanity. He even decided, tuberculin having given him only 15 per cent improvements, to try a new fevering agent — typhoid. It didn't give him even 15 per cent improvements.

But always in the back of his head was that notion that there was *one* fever that might. . . . But that fever was out of the question. Not a *practical* disease. No one knew much about it. You couldn't control it. So he didn't dare . . .

You see, the trouble was not so much with Wagner-Jauregg as it was with science. You can't cure a disease until you know what it is or why it is or at least *where* it is. And they didn't, before Kraepelin, know any of these things about insanity. Here he was, thinking about curing insanity when — why, it was like setting out to cure a sick man not knowing whether he had pneumonia or smallpox or angina pectoris.

Causes, for the most part, were not known, cures were not known. Were causes in the brain — or in the mind? The hypnotists and suggestionists and later the psychoanalysts were proving that often they were in the mind. The neurologists were insisting that they were in the brain — that for every mental disorder there was a definite brain lesion, and they were going to find it. Only give them enough microscopes and laboratories and autopsies and time — especially time — and they'd show you the exact spot in the brain where each and every mental disease originated. Said one of their spokesmen, "All mental derangements are due to definite disease processes and the sooner we agree to see this the better."

That was how things stood when Wagner-Jauregg set out to cure insanity.

And then came a series of wonderful events — outside the domain of Wagner-Jauregg but not escaping his watchful eyes, and finally, unrelated though they appeared, all fitted together by him into a proposition as logical as a Euclid theorem.

In 1895, in India, a Britisher in the Medical Service, Ronald

Ross, one of those rare jacks-of-all-trades who are good at all (he was a novelist, a dramatist, a poet, a mathematician, and a doctor), discovered the parasite of malaria in the tiny stomach of a certain mosquito known as the anopheles. "Mosquito Day" was announced and Ross was made Sir Ronald and given the Nobel Prize.

Anything to do with fever always excited Wagner-Jauregg and he made a mental note: cause of malaria discovered.

In 1905 the sharp eyes of Schaudinn spotted the *Spirochaeta pallida* (the pale spirochete) in the pus from an eruption of a victim of syphilis.

In 1905, Landsteiner proved that fever killed these spirochetes.

In 1906 came the practical Wassermann test, founded on Bordet's method, to indicate the presence of these spirochetes in the system of a man who doesn't even know he's sick.

In 1908 Plaut applied the Wassermann reaction test to the cerebrospinal fluid, which would indicate whether or not this pale monster had yet invaded the central nervous system.

In 1909, after 605 failures, Paul Ehrlich forged his magic bullet, salvarsan (which he thereupon called "606") to shoot down these all but invisible spirochetes.

In 1913 Noguchi and Moore spotted these twisting, vibrating spirochetes in the brain of a paretic, weaving its madness. Now it could be definitely stated: —

"Paresis (general paralysis) is softening of the brain due to the boring of that same *Spirochaeta pallida* which causes syphilis. Paresis is the fourth stage of syphilis, really syphilis of the central nervous system."

So now we had *one* insanity the cause of which was definitely known. And it *was* in the *brain*. The pathological school had scored a tremendous victory. Bending over their new high-power microscopes, stirring cultures, staining brain tissues, they had at last proved their point — that insanity is due to a physiological disease process. One insanity anyway.

Seven wonderful events, but what have they to do with Wag-

ner-Jauregg's problem and how is he going to combine them into a single proposition that is eventually to make him the first man ever to discover a cure for insanity?

Thus: —

Paresis is due to syphilitic lesions in the brain. Syphilis can be cured by Ehrlich's 606. Ergo —

He shoots great quantities of 606 into his paretics. With the highest hopes he has ever had. With what results? Where those spirochetes with their whiplash tails have crawled during the long interval between infection with syphilis and full-blown paresis, into the silent recesses of the brain, 606 can't reach them. A regular machine-gun fire of salvarsan makes no more impression on them than rain on a windowpane. . . . Failure — from the best hope yet.

And now again that notion which had bitten him way back in 1887, that there was *one* fever which might do it, began nagging at him. Malaria. . . . What of malaria? It was carried by the mosquito — therefore easy to transfer. It was no longer dangerous — quinine cured it.

Another thing: in the tropics (where certainly men were no more discreet about the diseases they contracted than in Europe) there was quite as much syphilis — but not nearly so much paresis. Why? Because of tropical fevers? Because of — malaria? Or did he have a one-track mind?

It is 1917 now and Wagner-Jauregg is chief of a large neuro-psychiatric hospital, the only one in Vienna, and the outstanding psychiatrist in Austria. He is his own man now.

One day a knock at his office door. (It is June 14, 1917, his great day.) A young doctor, casually, thinking nothing of it, reports to his chief that they have just received a shell-shocked patient from the front. Chap has malaria, too. Proceed with quinine as usual?

Malaria! The magic word. He half rises from his chair, drops back. He is an old man now, over sixty, and he is tired, very tired. Tired of seeing men go mad and die of paresis. Thirty years ago, if this chance had come to him! But at sixty —

Then he is on his feet again.

All the more reason for doing it now — at once. There is so little time left him — perhaps none. It is now or never!

He strides across the room and opens the door for his assistant to pass through first. (He never seems to realize that *he* should go first.) They enter the ward where the shell-shocked soldier tosses on his bed. Wagner-Jauregg looks only a moment, motions for a syringe, bends over, draws from his arm four cubic centimeters of blood, and stands there a moment looking at it against the sunlight, thinking perhaps of its deadly load of germs.

Then swiftly — not like an old man now — he strides out of that ward and into the ward of his doomed paretics. He stoops over the bed of one, a poor, crazy actor, and presses the needle into his back until two cubic centimeters of that microbe-loaded blood has streamed into his body.

Then he rises. He stands, holding the syringe with its remaining two centimeters of malarial blood and looking about him. Who next? Who of all these doomed men? He walks over to a little postal clerk, sitting there grinning vacuously. The rest of the tubeful goes into him.

It was done. It might mean death for these men, failure for him. But it had to be done. And now it was done, and he was glad.

He waited — for days. Then the fever came, and it almost burned their lives out, and the chills came, and it shook them like rags. And he had to let it go on. He even fevered seven others, just to make sure.

Then the fever was over and —

They were sitting up in bed, grinning sheepishly, several of these sick ones. They were looking about with clear eyes and seeing themselves for what they were — men once insane, now, by the wisdom and courage and obstinacy of one man, returned to sanity. There had never been anything like them and everybody knew it and crowded around to gaze on them.

1917 — 1927. Seventy years old and the Nobel Prize coming. He had done what no one had ever done, cured an incurable insanity, the only clear-cut conquest of science over a mental

disorder. Had this happened outside the walls of an insane asylum, his fame would have been as Pasteur's, as Lister's. As it is, few have even heard his name — Julius Wagner-Jauregg, with the *von* left out, if you please.

And he had scored the greatest victory to date for the pathological school. He had proved that one mental disease at least has its source in injury to the brain and can be cured by physiological measures.

Out of that first batch of nine whom he fevered, Wagner-Jauregg got four complete, lasting cures, men who, with clear heads and sound bodies, went back to their families and took up their lives where they had left off. Two others improved markedly, and stayed improved. So that was 44 per cent cures and another 22 per cent improved.

Such success didn't make a man ready to quit, even if he *was* over sixty, but ready to begin. Forty-four per cent cures? That was nothing. That was what you got when your patient was already far gone, when he had overt mental symptoms and when large areas of his brain had already been destroyed. Brain tissue, once destroyed, cannot be restored, and even if the process of destruction is stopped there, the man remains greatly deteriorated.

But suppose you could get your man while he still feels himself whole and sound — during that long period of incubation before the disease breaks into the open — before there is so much as a tremor or a lapse of memory to warn him that the pale corkscrew of paresis is drilling into his brain? That a man has taken the treatment for syphilis is no guarantee that the spirochetes have been completely wiped out. Already some may have penetrated to the central nervous system, and there, as he had proved, salvarsan was powerless to reach them. What then?

We doctors, he decided, must put on a crusade. We must induce everyone who has been exposed to syphilis to take the Wassermann test, to come early for treatment.

He and a friend of his, chief of a big syphilis clinic, started the crusade. And what a crusade it was, with this fellow Kyrle,

who, with his bushy beard and broad-brimmed black hat, looked for all the world like an artist from the Left Bank but was actually the soberest of scientists, reasoning, cajoling, pleading with his syphilitic patients, until at last, half persuaded but more exhausted, one after another of them said, "All right, go ahead. From now on I'm a guinea pig."

Yes, this doctor with a tongue of gold talked two hundred and fifty of his patients, first-year victims of syphilis and still many long years ahead of paresis, very likely in no danger of it, into undergoing a heroic new treatment which he described thus to them: half a dozen shots of Ehrlich's super-magic bullet, neosalvarsan; then malaria; then quinine; then a final half-dozen shots of neosalvarsan — and finis.

He put them to bed, able-bodied though they were, and gave them the full body-and-soul-racking course. . . . And every last spirochete, by the new sensitive Müller precipitation test, was done to death — except in three who refused to go through with the grueling treatment.

This proved paresis could be forestalled. This was scientifically sound — but, alas! not practical. Too many people have syphilis, too few go on to paresis, to make this a practicable routine procedure. No, a better way must be found.

They began persuading all suspected of having syphilis to submit to the diagnostic Wassermann test, usually of the blood and often of the cerebrospinal fluid; and in this way, long before the victim was near collapse, they were able to spot the spirochetes active in his nerve tissue. Of these early cases of paresis Wagner-Jauregg was able to cure, not 44 per cent, but 83 per cent.

One more thing before he dies.

He is always turning it over in his mind, this malaria treatment, seeing it from new angles. And one night he said to himself, "Look — malaria gets most of these spirochetes when they're in the central nervous system. And salvarsan usually gets them before they reach the central nervous system. So if I were to use *both* on a parietic patient — ?"

He did just that — and it jacked up his percentages amaz-

ingly. The two treatments working together lit a fire that carried into the remotest, most inaccessible recesses of body and brain, burning out every last whiplash of paresis.

Now, smothering all their finer feelings, they practically *advertized* for patients, these doctors, they practically hung out signs, "Consultation Free — Cure Guaranteed." They were so sure they could do it — *if* they could get their man in time.

It was a great crusade. It still is a great crusade. Wagner-Jauregg died in 1940, still leading it, but those to whom he taught his magic carry on.

It was several years ago that I first visited one of the wards at Bellevue Hospital in New York where the malaria fever treatment was given under the direction of Dr. Bernhard Dattner. For twenty years this Viennese psychiatrist worked under Wagner-Jauregg in Vienna and today he still works under his banner in America. Here are the notes I made on the treatment at that time.

Some of these men are paretics, yes — in the sense that the spirochete of syphilis has invaded the central nervous system. They are in bed, true — but not because even so much as a finger is paralyzed. There is nothing overt by which they themselves or a doctor could recognize that they are ill.

They are here, and there is a fever chart hanging at the foot of each bed with an inky line going up, up to  $102^{\circ}$ ,  $104^{\circ}$ ,  $105^{\circ}$ , and even higher, and then down to  $98.5^{\circ}$ , and then up, up again, eight times in all over a two weeks' period, because newer, more delicate tests than Wagner-Jauregg possessed have revealed the paresis that, for a long time yet, might not manifest itself in delusions and creeping paralysis. Or they are probable victims who are being treated prophylactically. They have been caught early enough to have an 83 per cent chance of recovery.

"Every year, every month almost, brings some advance which makes it possible for us to fight this insanity more effectually," said Dr. Dattner. "One of the great handicaps has been the length of time it has always taken to cure syphilis — a year and a half, two years. Well, only a short time ago they discovered a new 'drip' method whereby large amounts of relatively toxic

substances (arsenicals) can be administered intravenously and every sign of syphilis wiped out in five days.

"When the treatment took eighteen months or more, 84 per cent dropped out before its completion, carrying infection and the possibility of paresis with them. But anyone will give five days of his valuable time to a cure so simple, so inexpensive, so painless, and so sure as this five-day treatment. Also the research men are constantly developing new and more sensitive tests, and every man or woman who has the slightest reason to suspect infection should take the necessary tests at once. The Wassermann is one of a number of biological tests of the blood and spinal fluid. Other newer tests pick up in the spinal fluid such telltale signs as increased protein and lymphocytes, colloidal gold changes and so on, indicating the presence of paresis. Recently a new twenty-minute test, requiring only two drops of blood, was developed for syphilis, as accurate as the Wassermann, Klein, and Kahn tests which take up to twenty-four hours.

"There are even new ways of fevering. There had always been two ways — by mosquito and by syringe. Personally I prefer the direct inoculation with malarial blood from one patient to another. At one time there was, against this method, great hoot and cry. We were not only spreading malaria but transferring syphilis from one patient to another! Even the great Dr. William White, who introduced the malaria treatment into America at St. Elizabeth's in Washington, insisted on getting fresh, syphilis-free malarial blood for every new patient. Well, think! Since you are shooting syphilitic blood into a syphilitic, what harm can it do? And besides, fresh uncontaminated malarial blood isn't easy to get. In Vienna we kept one strain of malaria going for twenty-two years, all from the same original donor, carried direct from one patient to the next. Here at Bellevue, ever since I came two years ago, we have kept one strain going — will, for many years to come. But naturally it is syphilitic blood.

"And then, some years ago, came this new way of fevering, not malaria at all, not any disease. A man-made fever."

It happened in the research laboratory of the General Electric Company. In a room apart stood a powerful short-wave radio transmitter capable of broadcasting a symphony concert or a corn-plaster advertizement clear around the globe.

The men appointed to valet this monster always went around feeling as though they were sickening for something, never actually coming down with anything, but having chills and fevers, until one day their chief stuck thermometers in all their mouths and discovered, sure enough, every one of them was running a temperature.

So Willis Whitney, their chief, whose job was electrical engineering, turned amateur physiologist. With some professional help, he figured out a little machine for fevering rabbits. Next, fired with the spirit of medical research, he decided to find out what this man-made fever of his was good for — if anything. So he inoculated his rabbits with syphilis — and then burned it out of them, just as effectually as if this mechanical fever were malaria.

Then he made a great big machine, one big enough for a man — a bed with a curved, sliding celotex cover through which a doctor could watch his patient broiling. And one day he went to the Psychiatric Institute at the Medical Center in New York and explained to the doctors. Here, he said, was a good clean fever wrapped in cellophane, no microbes, no possibility of infection — did they think it might burn out paresis, as it did syphilis — in rabbits? Or did it take microbe to fight microbe in the recesses of the brain?

The doctors looked at one another. Fine questions for a layman! Leave the machine, they said, in their noncommittal way. They'd try it out.

They tried it on a number of paretics, pushing them in and out of the oven on alternate days as if they were so many loaves of bread. And in the end they announced it as their belief that it was the fever itself, not a microbe, that killed the spirochetes of insanity. For this neat, clean, electrical fever, it seemed, brought just as many paretics back to life and sanity as did malaria.

"It's a good fever," continued Dr. Dattner. "It does just what malaria does — but no more. Besides, it's a luxury treatment. Machines cost more than germs. A public hospital can't afford them and the extra doctors and attendants they require. Most hospitals use malaria.

"As to the percentage of cures in paresis, everything depends, as in tuberculosis, on how far the disease has gone. A lung can never be replaced. Brain cells cannot be replaced. But there are many silent areas in the brain, damage to which does not show up in behavior or intelligence. Moreover, the compensation of the brain is remarkable. Let a certain part be destroyed and frequently some other part will take up its functions. Since normally we use only a small part of our brains, there are always reserves to be drawn on. Much depends on which parts of the brain have been attacked; much depends upon how long the destruction has been going on. There are all degrees of improvement up to complete cure.

"In bad cases the improvement is usually slow, over a period of years, as the recuperative powers of the body gradually get going. This improvement is registered in the gradual change in the spinal fluid. We have an absolute check, in these tests, upon our results.

"Incredible cures occur. Men who have fallen below the beast in intelligence and behavior can sometimes be brought back to be decent, clearheaded human beings, self-supporting and socially acceptable. That's one of the things that make this whole problem so fascinating — why one very deteriorated case will clear up entirely and another not nearly so bad not improve at all.

"There are a number of other things we are still trying to find out. Why is it that very occasionally one of those who get the inoculation but doesn't run a fever still gets well? Why? How is it we can't *force* the fever? Why do some light cases of syphilis go on to paresis and other severe cases stop short of it? Why is it that malaria plus salvarsan works so much better than either alone? These are a few of the things we'd like to know.

"Of one thing we are certain. We have laid our finger on the

cause of this psychosis. There is a definite pathology of the brain which you can, in an autopsy, see under the microscope — and it is the same from New York to Shanghai. There can be no question that this insanity is due to disease of the brain.” This is the report of a few years ago. Recently I again interviewed Dr. Dattner. A medical event of the first importance had taken place in the interim. Let Dr. Dattner tell of it.

“The malaria fever treatment was highly efficacious but suddenly, almost overnight, our whole thinking had to be revised because of a revolutionary new drug. Yes, of course, penicillin.

“We started a research project into its value in neurosyphilis — paresis. In fourteen days it wiped out every trace of disease. Not only did it shorten the time of treatment from four or five weeks to two weeks but it eliminated the discomfort of fever and the danger of the toxic arsenicals. We treated our first patients over two years ago and they are still as well, by the most refined tests, as those formerly treated with malaria fever. Two years is not permanent, true, but our impression is that these penicillin-treated patients will remain well.

“It looks now as though penicillin would supersede malaria fever. Of course it may eventually work out that some combination of all three — penicillin, fever, and arsenicals — will yield the best results. Two years doesn’t give all the answers.”

That was a magnificent triumph for the pathological psychiatrists — the conquest of paresis. A pathology of the brain cells is something anyone can see under a microscope, but how are you going to prove an Oedipus complex?

But, replied the psychological school, a bit daunted but unbowed, paresis is only *one* insanity — a terrible one but, after all, a minor one. Only a very small per cent, perhaps 10 per cent, of all the insane in hospitals are paretics; only 2 per cent of all who get syphilis go on to paresis. Moreover, it was to be expected that a pathological cause would be found for paresis, there are so many physical symptoms — the paralysis, the strokes, the disordered gait, the stumbling speech. But how about schizophrenia, where there are no such overt physical symptoms and the body is often as healthy as that of a normal person?

We grant you paresis, said the psychological men. But until

you can prove that schizophrenia is an organic disease, we don't yield another inch.

That was where, when Wagner-Jauregg finished his work, the psychiatrist stood — 90 per cent of his problem still unsolved.

What, he must still ask himself, is the cause of the great mass of insanity? Inner tensions combining with external events to dash reason from its seat? Or a disease process?

Yes, their greatest problems still lay before them. Schizophrenia, for example. Sixty per cent of all the mentally ill are schizophrenics. *Fifty per cent of all who occupy hospital beds in the United States*, 50 per cent of all who are sufficiently ill, physically or mentally, to be in a hospital, are schizophrenics.

Schizophrenia, which is another name for dementia praecox (adolescent insanity). The insanity of youth, claiming one in twenty of all the boys and girls who graduate from our high schools every year. The insanity from which only 15 to 20 per cent spontaneously recover.

There is no other problem in psychiatry to compare with this. Until they have conquered this, they are beaten — and they know it.

Will they conquer it? And if they do, whose will be the victory? Surgeon or psychoanalyst? Bacteriologist or biochemist? Or some new breed of scientist at whom we cannot even guess?

That is the epic struggle we are now about to witness.

Wagner-Jauregg had given the physiological psychiatrists new hope. Nothing could stop them now. We come to the great day of psychiatry, our own day. We come to the era of its seething activity, of its great discoveries, piling one on another, tumbling over one another, biochemist vying with bacteriologist, pathologist with physiologist, endocrinologist with surgeon. All the greatest advances in psychiatry have come about since the beginning of the century, in your lifetime and mine. Every branch of medicine, and many sciences far outside the field of medicine, have made their contributions. Let us enter the research laboratory, the clinic, the doctor's office, the hospital, and see these great events take place.

Suppose we start with a young Viennese psychiatrist working in an asylum in Berlin in 1927.

X

## *I Saw a Resurrection*

THE Lichterfelde Hospital for Mental Diseases in Berlin — 2 A.M. of a spring morning in 1927.

At that quiet hour the doctor in charge receives the call. A certain patient in the addicts' ward has become violent. With more than his usual haste he hurries through the corridors. He is not yet blasé about these emergency calls. He is too young for that, almost too young to be a psychiatrist at all. He is only twenty-six. Besides, this is a very special case. The patient is a famous actress, one whom the young doctor has always admired.

As he opens the door the woman breaks from the attendants and rushes toward him.

"Give me morphine," she babbles, not pleading — threatening. "At once, you understand. Morphine at once or . . ."

"Very well," nods the doctor. "I'll fix you up."

"But instantly, instantly!" she demands.

"Of course, at once," the doctor agrees. "Lie quiet. I'll give you a hypodermic."

Now is the moment, he decides, to try the new treatment he had already made up his mind he would try when things came to this pass. He has tried everything else, all the routine procedures outlined in the medical books for the cure of morphinists. Deprived of this drug, the woman suffers intolerably, becomes violent, homicidal. Nothing can quiet her — not luminal, hyoscine, the barbiturates. Seventeen or more "cures" by seventeen or more doctors have failed to help her. So the

young doctor thinks, "Since nothing known will work, why not try the unknown?"

Long enough to receive the injection, the woman restrains herself. Then she moans and turns away. Soon she is quiet, then drowsy, then in deep sleep.

But the young doctor is uneasy. Not morphine, but a forbidden dose of a dangerous drug is what he has given. He has given it believing that it might do for her what none of the prescribed procedures has done. And so it might — but still it was a forbidden dose of a dangerous drug. He distrusts this sleep.

So he sits all night at the bedside, watching every flicker of an eyelash, every breath, as though it were a matter of life and death, as indeed it may be. Only when at dawn the patient stirs, opens her eyes, and calls for food, does he dare to leave her.

That night again the actress becomes violent, and he repeats the unorthodox procedure, remaining all night on watch. And the next night — and the next. He won't admit even to himself that he has any definite hopes of a cure, but still . . .

Then one night (he is feeling pretty safe by this time; there have been none of the alarming developments he had feared) it happens. What above all else he has dreaded — an epileptic seizure. But fearing it, he has prepared for it. The hypodermic is ready and as he presses home the needle, the rigid body collapses.

The young doctor pulls a handkerchief from his breast pocket and draws it across his forehead. He sits down, feeling a little shaky.

In a matter of minutes the woman who had, so short a time before, been practically a raving maniac, turns to him and smiles.

"Thanks, Dr. Sakel," she says. "I don't know what you did, but I feel like my old self — for the first time in many months. I'd like to talk a while, if you don't mind. It will be so good to talk as one normal human being to another again."

Dr. Sakel assumes a nonchalant air. A doctor must act as

though whatever happens were exactly what he had expected. But this is really extraordinary. A short time ago a creature beside herself; now, not a person stupefied by drugs, but one who can talk and laugh like any normal human being. He couldn't admit it, of course, but he is considerably startled himself by this sudden turn of affairs.

He sits and chats with her till sunrise, seeing her become every moment more the charming, vital person she had been before her illness.

Then he goes to his room. Not to sleep. To think.

For weeks, ever since this patient had been handed over to him, young Sakel, working and eating, talking and reading, has had one question on his mind. It was this: This woman is a drug addict. She is here to be cured, if cure there is. She has been totally deprived of her drug. This deprivation has brought her to the brink of madness. *Why?*

If he could answer that — but there was no answer. None in the talk of the old doctors. None in the medical books. He had read them all — at one huge gulp. For he must find the answer at once, so that he could help this intelligent and charming woman who was swiftly disintegrating into a creature less than human. And not her alone, but all those others, out in the wards. . . .

He read the medical books between bites, he read them between snatches of sleep, he read as he hurried from ward to ward. He tried out this on one addict, that on another. None of the prescribed procedures worked. Nothing but their drug would quiet them. Somewhere, how far in the future you couldn't know, there was an answer, there was to every question. Why couldn't it be now? Although it wasn't in any of the books, English, French, or German, it would some day be in some man's mind. Why not in his mind now?

At that he had flung all the books into a heap in the corner of his room and had sat down to find the answer in his own mind. He had said to himself (this was one afternoon several weeks before that first hurry call in the night): "I'll clean all this rubbish out of my mind. I'll throw away everything I've ever

learned about the treatment of addiction, all the academic knowledge of the past. I've examined it and the answer isn't there.

"Now! I am alone in a desert — with this patient who is an addict. I know *nothing* of what has been done before in such cases. I am the first man who has ever tried to cure this condition. Well — what is wrong with this woman?

"She suffers. Horribly. I have never seen anyone suffer so. She suffers because she has been deprived of her drug. Why? . . . *Why?* Am I inclined to think, as others think — but no, I'm not going to consider what the others think. Do I then incline to think that this suffering is purely psychological?" Here he paused. "Do I?"

He began to pace back and forth. He really believed that just by thinking hard, within the bare walls of his mind, he might discover the answer. All he had to do was *think*.

Coming to the end of his room, he slowly dropped onto his bed, his hands in his pockets. Sat there. Stared, without seeing, at the one blank window. This, you must remember, was over eighteen years ago. When Freud was, to many, not the name of a man, but of a god. When the psychological approach to mental disorders was in the ascendant. When sick minds were treated with words — and cured. True, there were Wagner-Jauregg and paresis — but paresis was only a tiny segment of the great circle of mental disorders, and besides it manifested such gross physical symptoms that it was quite obviously an organic disease. For other mental illnesses the theory of psychogenesis (mental origin) was widely accepted. Even to question this was venturesome. . . . And here was one Sakel, too young to be a psychiatrist, unknown, unnoticed even, sitting on the edge of his bed and questioning it.

"No," he said at last, "I *don't* believe it! I don't believe that that woman's suffering is purely — no, nor even chiefly — psychological. I believe it's primarily *patho-physiological*. I believe that the chemistry of the body, and chiefly of the autonomous nervous system, has been changed by the use of drugs and now only some counter physiological measure will restore it to

normal. Since the body-mind is a unit forever inseparable, there's no such thing as purely psychological suffering. There's always a physiological background." He chuckled. "Only in Alice's Wonderland does the grin exist without the cat.

"So, that being the case, what is the physiological basis of this woman's suffering?"

It was getting tougher now. He thrust his hands deeper into his pockets and scowled.

"She suffers because she is deprived of her drug. She *must* have it, have more and more. It is a *physical* craving. Why?

"Perhaps — a good enough perhaps to go on — the functioning of the center of the vegetative nervous system, the hypothalamus, mediator between body and mind, has been disturbed. Very well then, how do I re-establish the normal functioning of the vegetative nervous system and so influence the mental state of this woman? Well, I know this: that drugs can reach and change the chemistry of the vegetative nervous system.

"Drugs. *Drugs*. What drugs? . . . There was that case of the man to whom I gave what proved to be, for him, an overdose of insulin. Remember what happened? Remember?" . . . Now he was on his feet again. By Jove . . . !

And then he had it. Insulin! Look, this is how it might work. The nerve cells of the morphine addict, deprived of morphine, call upon the body for adrenalin to take its place — and get it. Get a huge oversupply of it, and so the victim is greatly overstimulated. Hence his raving.

Now! Now the idea would be to block the nerve cells so they couldn't get this oversupply of adrenalin. What drug neutralizes adrenalin? . . . Insulin. And *only* insulin. Adrenalin is a body secretion — and so is insulin; both act on the vegetative nervous system in opposite ways and thus hold it in balance, one checking the other. . . . Well, then!

He snapped his fingers. As simple as that! And the old docs had never thought of it! Oh, he knew he'd get it if only he put his mind to it!

Suddenly he slumped. *Was* it as simple as that? Why had the old docs never prescribed insulin? *Why?* Because, blinded by

their theories of psychogenesis, they ignored the pathophysiological background of emotional disturbances. And even if they had hit upon insulin, they wouldn't have used it. Because, for what he had in mind, the treatment of nondiabetic psychopaths, in the doses he contemplated, just short of shock, it was a risky business. And not being able to judge very accurately just how much it would take in any given case to neutralize an unknown oversupply of adrenalin in the patient's nervous system, you might very easily give more than enough, mightn't you? And then you'd have too much insulin — and be as badly off as with too much adrenalin. Worse! Much worse. For an overdose of insulin could cause a shock which might end in death. The tiniest fraction too much and your man, in the snap of a finger, might be gone. Give an overdose to an animal — he'd done it many times — and not nine times out of ten, but ten out of ten, that animal had a fit which was fatal if you did not intervene at the right split second. So who would try this tricky procedure on a human being? It *might* cure the illness — but it might also kill the patient. And then where was your cure? And where were you? Behind prison bars — that's where you were!

So no doctor was trying that, thank you. The law forbade such experimental treatments and so did your conscience and your regard for your own hide.

That was a poser. It took a lot of walking around to solve that one. Even if, *maybe*, he'd solved the problem *medically*, he hadn't solved it legally or, what was more, ethically. You couldn't take a chance on killing a man because you thought *maybe* you had a bright idea.

But he was forgetting. He was alone in a desert. No sharp-eyed attendants. No professional jealousies. No accusing relatives at the funeral. No courts of law, prison bars, man-made justice. Just himself and his patient and divine justice.

Well then? . . . Well, if that other human being were he and he were that other human being, what would *he* want? He'd want, by heaven, to be sane again — or to be dead!

Well, then, that was that. So the very next time the call came, "Hurry, doctor — patient violent," he'd *do* it! Deliber-

ately give, as nearly as he could judge, enough insulin to neutralize the excess adrenalin.

Besides, there was always glucose. Thank a doctor's God for glucose!

So that night at 2 A.M. when the call came and he hurried through the corridors, he had his insulin ready—and you have seen what happened.

Then tonight, unaccountably, with exactly the same overdose as on previous nights, had come that frightening epileptic seizure. And following the fit—the miracle. Nothing more dramatic could be imagined than that transition from raving to complete lucidity. This had not happened on former occasions when the insulin had produced sleep. Always on waking from this stupor she had reverted to the vicious, unruly creature she had been ever since her admission to the hospital.

So it looked, didn't it, as if it were the fit that had produced the miracle? So?

That is too big a question now. He is tired. He must leave it for another day. In the broad sunlight he drops off to sleep.

When he looked in on his actress late that afternoon she was entertaining patients and attendants with imitations of famous Hollywood stars, she who had had for them previously nothing but curses and threats.

"She's a perfect darling," one of the nurses told him. "Already everyone is in love with her."

Still, he thinks, as he closes the door, it may be just an accident. It might never happen again.

But one thing now he was resolved to do. And that afternoon he did it. He went to the addicts' ward with his little bottles of insulin and began giving injections. But he was cautious. To the best of his ability he gave only borderline doses so as to avoid shock and he stood ready with a shot of glucose if things threatened to go too far. And it worked! Worked miraculously, as it had that first night with the actress, putting them quietly to sleep. Not only that, repeated treatments improved not only addicts but other psychopathic and neurotic conditions as well.

But in spite of the utmost care, the insulin occasionally pro-

duced an epileptic seizure or a deep coma, and though he was now getting a little accustomed to them, they still frightened him. The day might come, he sternly told himself, when he wouldn't be able to terminate one of those seizures. And as he went about his duties, he kept revolving in his mind ways to avoid these shocks.

What he wanted to achieve in such cases was a borderline dose of insulin, one that would give relief without producing shock. But how ascertain that borderline dose? What drug would keep the insulin within bounds?

The barbiturates? Yes, a good chance. But, Lord, a doctor can't go around experimenting on his patients! So he tried out the barbiturates on mice — and they worked. But he couldn't be sure they would work with humans. Mice are not men.

So he went on doing the best he could with insulin and, when a seizure developed, a swift injection of glucose or adrenalin to terminate it.

And he was lucky. No fatalities. On the contrary, as the days passed, one thing became increasingly clear. Those to whom, unintentionally, he gave what proved to be for them a huge overdose of insulin and who developed convulsions, all, every one of them, underwent that dramatic change of personality. *That* was no accident. What had happened to the actress was not the exception. It was the rule. . . . Gradually a daring project formed in his mind.

Finally, one afternoon, when a man who had been a vicious and sadistic beast came out of a convulsion a reasonable and likable fellow, he locked himself into his room, determined to think this thing out.

Look. The fit was an accident. He didn't intend to produce it. On the contrary, he did everything in his power to avoid it. But sometimes, no matter how careful he was, he got a convulsion.

Very well. The fit was an accident. *But the result of the fit was no accident.* So?

So?

The answer was obvious.

Yes, yes, all right. But what if a patient broke a few bones or died in a deliberately produced fit? And even if there were no accidents, there was bound to be talk. If the authorities once got wind of it! Remember, this was in Germany in 1927 where Herr Doktor was a good title but Herr Richter was a better — above all, where *verboten* even then had an authority it has in no other country.

So how could he dare deliberately to produce a seizure? Eh? . . . Consider your own skin, Sakel.

Suddenly he sat up. *That actress was a borderline if not an actual psychotic!* So was that man today, so were all the others to whom he'd been giving the insulin — psychopaths all for they had forsaken all moral law though their faculty of thinking remained undisturbed. Well, if this insulin overdosage could restore these borderline cases and psychopaths to normal, might it not — ?

Now see. These patients to whom he had accidentally given too large an overdose of insulin underwent a violent shock. And during that shock, in the shadow of death, something extraordinary happened, for they came out of it, no longer disintegrated personalities, no longer amoral, argumentative, vicious, but their own charming and amiable selves — if their own selves ever *had* been charming and amiable. So!

Now do you see where his mind was driving? He was a psychiatrist. He practised in the Lichterfelde Hospital for Mental Diseases in Berlin where the patients were not only drug addicts and alcoholics, but psychopaths and psychotics of every persuasion. And he had discovered a treatment which seemed to restore to minds disordered by drugs their former balance.

Now it dawned. Why not — why not try this shock treatment on — on the frankly insane?

Now he is on his feet. Could this be sound medicine? Physiological shock to restore unbalanced minds? *How* would it work — if it did?

Never mind. Never mind all that. Just see if it *does* work. You could look for the *how* afterward. He had this to go on:

that he had proved that it was something wrong with the mid-brain that had manifested itself as something wrong with the mind; and that, with drug addicts, drugs did, never mind *how*, correct that something wrong. Perhaps through their action on the center of the vegetative nervous system. Perhaps . . . Oh, forget all that and get to work. All right. On whom? Best to start slowly — a case not too complicated, not too obdurate. One where he had at least a fifty-fifty chance of success. If it worked there, then he'd tackle a more difficult case, work up finally to — to the incurables!

But now he began to be alarmed. "This is going too far," he thought. "Maybe I'm cracked myself. It's not unreasonable to hope that I might cure a hysteric this way but — but a schizophrenic! That's a bit thick."

Abruptly he came to a standstill.

"But if I don't take on an incurable case, they'll say — I'll say myself — that it might be a case of spontaneous recovery. The patient would have got well anyway, without my treatment. . . . So I *must* take an incurable case. Not later on — *first!*"

Very well, since it must be done — and with him it was now a case of *must* — he'd do it at once, today — *right now!* . . . His hand on the door, he drew back. This is all very fine, you're a great fellow, Sakel, but are you sure you can produce a fit at will? So far, remember, the fit has been only occasional. Now you want a fit *every time*. How do you know you can get it?

A huge overdose. Fine! Great! And then? Perhaps a seizure you can't control — or a coma from which you can't arouse your man. That's dangerous, old man.

Yes, it was dangerous. But — the stake was higher now. It was not a mind deranged by drugs or alcohol, but one utterly lost, gone beyond the saving of all the doctors and Freudians in the world — and gone forever. So he must take bigger chances. No one (except himself) had anything to lose.

So he put his hand on the door — and went out.

That was in 1927. A great deal of water has flowed under this bridge since 1927. Dr. Manfred Sakel, the discoverer of the

physiological shock treatment for schizophrenia and other psychoses, is still a comparatively young man — only forty-five — and long a very famous man.

He lives in New York. There are, thank Hitler, a great many foreign doctors and scientists living in America today, from Einstein down. There may even be too many of them, making it tough for our own medicos, but a few like Sakel might make up even for that. Many have come bringing their great discoveries, so that Germany's loss is our gain.

Of these is Sakel.

When we think of miracles, what comes to mind? The changing of water into wine, the multiplying of a few small loaves and fishes into a feast for thousands, the raising of Lazarus. Or perhaps the stories of the lame, the halt, and the blind restored to health at some sacred shrine. These are the miracles of religion.

But there are other miracles, depending not upon faith but upon science, and one of the greatest of these is the miracle which restores not life but a soul. This, too, like the raising of Lazarus, is a resurrection.

I saw such a resurrection.

I am in a room in a hospital with Dr. Sakel and two nurses.

A girl lies immobile on the bed. She is young, only nineteen, and in life (for this is not life) she must have been very pretty. The face is of a deathly pallor. Dark curls are spilled on the pillow. Dark eyes, wide but unseeing.

The doctor bends over her, takes her hand.

"Good morning," he says. (We will forgo the accent, which, though the two peoples speak the same language, falls so much more lightly on English from Austrian than from German lips.) "You feel better this morning, don't you?"

Not a flicker of expression in the fixed eyes. The hand drops back, as the doctor releases it, into its former position.

This is no casual, accidental pose her body has taken. It is stereotyped and unchanging. She lies crouched, legs drawn up, arms wrapped around the knees — the embryonic position

so often assumed by catatonics. If the nurse moves an arm or a leg, as soon as it is released it resumes its former position.

"She was like this when she came here a month ago," the nurse tells me. "She seldom moved, seldom spoke, wouldn't dress, refused to eat. Usually we had to feed her by tube."

Dr. Sakel bends over and gives her the insulin injection, then comes and sits beside me.

"Doris has been ill over a year," he explains. "As you see, she is still a very sick girl. Hers is the stuporous condition called catatonia, one of the classic types of dementia praecox.

"The insulin produces two types of shock — coma, which we call the 'wet shock' because the patient perspires and salivates profusely, and the 'dry shock,' the epileptic type of reaction. Sometimes patients react with one type of shock, sometimes with the other. Only about 10 per cent of the time do we get convulsions when insulin alone is used. So when the course of treatment and the type of case indicate that an occasional dry shock would be beneficial and it doesn't come of itself, we can provoke these convulsions during the course of the coma by injecting an additional convulsant drug, such as camphor or metrazol.

"In Doris' case a few of these dry shocks might prove very helpful. They usually are, in catatonic stupor. But we must go slowly. It takes several weeks, increasing the dose every few days, to work up to the point of shock, whether that shock is to be coma or convulsions. Today we have about reached the shock point but we can't tell what form it will take, or even if it will surely come today. You see —" he waved a hand toward the bed — "she is completely withdrawn from life. She won't speak, won't dress, won't eat, won't *move*. I shouldn't say *won't* — I should say *can't*, for her will is not active in all this. It is — well, slackened. By what? By some physiological condition.

"When I tell you that I began giving Doris the treatment almost a month ago, you won't think we have made much progress. She couldn't be worse than this, you think. I agree with you. But it isn't time for any great improvement yet. That usually doesn't come until we enter the second, or shock, phase."

He rises and goes to the bed. He feels the girl's pulse, takes her blood pressure, listens to her breathing, examines the chart on which the nurses, constantly checking the many complicated processes of living, have jotted down their reports. Then he leans close to her ear.

"Doris," he says distinctly, "I want you to say, 'Good morning, Dr. Sakel.' "

No answer.

"You wouldn't think she heard, would 'you?'" he says. "She does. A hearing without hearing. A seeing without seeing. For one really hears and sees with the mind."

He tries again, close to her ear.

"What — is — your — name?"

It is like trying to talk to someone on Mars. No movement. It seems strange that he should treat this Thing on the bed as though it were alive, expect a human reaction from it. It is more frighteningly inhuman, more unnatural than a wax figure.

"No reaction yet," he says to a nurse. He comes and sits down beside me.

"So many of these dementia praecox cases are young. If they are old, they have grown old with their insanity. . . . Doris was a college student, quite a brilliant girl. Everything in her favor — good home, loving parents, seemingly well adjusted to life, until eighteen months ago. Then she began to be, as people say, 'queer.' She began to withdraw from outside contacts. It seemed no more than a mood at first. She just didn't care about going out, became indifferent to the things she'd always been crazy about — skiing, parties, school plays. When they tried to coax her, she grew irritable, even ugly.

"She had wanted to be — of all things — an archeologist. Now she came home from college suddenly and said she wasn't going back. She had been interested enough in one boy to wear his fraternity pin. Now she just left it in the bureau drawer. Gradually she slipped into not going to meals, not combing her hair, not bathing, finally not getting up at all. By slow degrees she came to *this*."

He pulls his chair closer to the bed and touches her hand.

"What is your name?" he asks, and again, very distinctly, "What is your name?"

A squirm of the features.

"That's better," he says, patting her hand.

He turns sidewise to me.

"They tried everything before she came here," he says. "You wouldn't believe the things they tried. They tried, believe it or not, sleep — prolonged narcosis with various drugs. Seemed to think she might wake up well. But miracles don't just happen. They have to be planned.

"Next they tried a forced endocrine treatment, autogenous vaccine treatment, short-wave treatments, tuberculin treatment, vitamins, an energetic typhoid vaccine treatment with temperatures to above 39° C. At least that produced some reaction. It made the girl a raving maniac instead of a stuporous one so that now even modiskop had no effect.

"In the eighth month they quit all treatments. Maybe rest would do it. Merely wishful thinking. So back to drugs — different drugs, this time. No use. Try salt baths, massage, tonics. No result. In desperation, after consultation, the doctors recommended the insulin treatment. Doris was brought here. They had lost a lot of time and in these cases, as in cancer, time is the *most* important element."

He goes over to the figure on the bed, watching closely for any signs of change. Again he addresses it.

"What is your name?"

And now, as we watch, the vacant face grimaces, the lips work and finally produce the words, "I — don't — know." The voice is as unnatural, as mechanical as a deaf-mute's.

Dr. Sakel takes her chart from the foot of the bed and walks with it to the window. He beckons me.

"We started treatment thirty days ago," he points out on the chart. "On the first day, we began with thirty units of insulin. Today we reach 120. . . ."

"Doctor!" cries a nurse.

He wheels, is at the bedside in a stride.

I hear a penetrating cry — the scream of the epileptic. The

figure on the bed is grotesquely contorted, the head is strained to the right, the eyes are rolled to the right. During its violent convulsions, the body assumes tetanic postures, the face turns blue.

The nurses stand ready with twisted sheets and glucose. The doctor waves them aside. In the minute and a half that the seizure lasts, he does not interfere — merely watches. Once he murmurs, "Glucose ready?" and a nurse reaches for a glass.

It is over. A deathlike stillness follows. Then, from the midst of the stooping figures, comes a voice — a new voice in that room.

"Where — am — I?" it says softly and wonderingly. And again: "This is not my home. I want to go home to my mother and father."

The doctor raises her, puts the glass in her hand.

"Drink this at once," he orders. "Your sugar tea first. After that we can talk."

Obediently the girl drains the glass of glucose and water.

"That is to prevent another fit," a nurse whispers to me.

The doctor is speaking: "You have been ill, Doris, don't you remember? You are here with Dr. Sakel. *I* am Dr. Sakel, who is helping you to get well."

"I want my mother."

"She will be here soon. She will be happy to see how well you are today, better than ever before. Are you hungry?"

"Oh, yes. I want my breakfast."

"Miss Simpson will get it for you."

He pulls a chair up to the bed. A long silence. Then the doctor bends low and I hear him say in surprise, "Why, Doris, you are crying!"

Low sobs, growing louder, growing heartbroken.

"I remember — my mother came yesterday — after the treatment. I — I was awake, but so ill — so ill I didn't know her. When she kissed me, I struck her. And now — perhaps she won't love me. I remember her face when I struck her. Do — do you think she will come today?"

"My child, your parents don't love you less because you are ill — only more, much more."

"But — if I should do it again?"

"I don't think you will. You are getting better every day after your treatment. After today there will be a big improvement, more than ever. Soon you'll be entirely well."

The sobs become long, shuddering breaths.

The nurse joins me at the window.

"What a change!" she whispers. "She has never been like this. Why, she seems perfectly normal!"

We hear the doctor asking: "How old are you, Doris?"

"Seventeen. I'll be eighteen in March."

"No, you're nineteen," he corrects her. "You've been ill over a year."

"Only seventeen," persists the voice, growing a little anxious. "I'm — I'm a freshman in college."

"You'll remember better in a little while," the doctor assures her. "You'll remember the dance you went to on your eighteenth birthday. And the ring your father gave you when you were nineteen."

"Don't say that, Dr. Sakel. I can't afford to lose two years. I have all that work to do at college. I *can't* be nineteen."

"We won't worry about that now. Perhaps after your breakfast you'll remember better."

"But I want my mother! I want to tell her — " The voice is beginning to be a little frightened now, a little hysterical.

"We'll call her at once and tell her how much better you are. She'll be so happy. . . . Would you like to call her yourself, Doris? You remember the number?"

"Yes — yes. I can call her. May I?"

The doctor hands her the instrument. I hear her give a number, hear her cry, "Mother! Oh, Mumsy darling!"

Outside in the hall Dr. Sakel joins me.

"That seizure was just what was needed now," he says. "I felt today that we had probably reached the shock dose, but I couldn't be sure. Suddenly, without preliminaries, as is usually the case; the fit came. Previously, after each treatment, there

has been a slight — oh, so slight that to any but the trained eye it would seem like nothing at all — improvement, as much as could usually be expected in the pre-shock phase of the treatment. But today — !”

I heard later of Doris from Dr. Sakel. Her recovery was rapid. After each succeeding shock she returned to normal consciousness for a longer period and with more of lost mind regained.

In *two weeks* she was almost normal, with only short relapses. Very soon she was completely well.

That was over a year ago.

She comes to see Dr. Sakel often, as a friend. She speaks of her illness frankly, as one would speak of an attack of pneumonia. Never, her parents say, has she been so well-balanced, so well-integrated and so stable. She has more ambition, more confidence, more concentration than ever before. She graduates from college next spring.

That was the resurrection I saw.

The shock treatment in all its variations for schizophrenia (dementia praecox) is today the “treatment of choice” in many hospitals throughout the world. It is not universally or unquestioningly accepted by the medical profession. But at the very least, this can be said: that because of Sakel’s discovery, dementia praecox is no longer an incurable disease — as, in spite of occasional spontaneous recoveries, it was before.

No cure for any disease is 100 per cent — or anywhere near it. They *all* fail when they get up against the right set of circumstances. We still die in our thousands of the most curable diseases. So it seems pretty silly, doesn’t it, to demand right off the bat that the shock treatment cure a whopping percentage of schizophrenics? No matter how old they are. No matter how long they’ve been ill. No matter what their heredity. No matter what kind of environment they come from and must return to. No matter what their physical and mental constitutions. And particularly *no matter how little qualified their doctors may be to give the treatment.*

Right there is the major weakness. The doctors themselves.

Sakel's classical shock treatment with all its variations is an exceedingly difficult and a rather dangerous procedure in inexperienced hands, demanding, as it does, no ordinary medical ability but great skill, a knowledge of psychiatry as well as medicine, and long experience. Above all, experience.

More than a quarter of a century after Lister demonstrated the use of antiseptics in surgery (before Lister, it was a two-to-one shot the patient would die of the operation) the greatest surgeon of that day, so great that he was Queen Victoria's own man, so great that when he delivered an address in London in 1881, Pasteur, Virchow, Koch, Charcot, Darwin, Huxley, Tyndall, and all the medical Pooh-Bahs of every nation gathered like flies to hear him, and the Prince of Wales and the Crown Prince of Germany were merely Hollywood extras in the audience — this great surgeon, James Paget, said of Lister's discovery, "His success has been so great in contrast with my failures that I cannot for a moment doubt its value."

Here was a supreme technician convinced and willing to make public confession that the technique of a fellow surgeon was beyond him.

Are the majority of doctors in our day so humble? They try the insulin shock. They fail. . . . It's a washout! They see others try and fail — and it's a double-dyed washout. The plain truth of the matter is that very few doctors are qualified to administer this treatment. Where could they have learned it? Not yet in most medical schools. Many even of those who attempt it have only the foggiest notion of what they're up to. Perhaps they have not even had a brief course in this difficult therapy. Perhaps they have not even witnessed an expert demonstration. Perhaps they have not even read Dr. Sakel's book on the methodology. (You'd be surprised how often that happens.) Still, it's a washout.

In spite of which it is curing an encouraging number of psychotics who would otherwise have gone mad to their graves. It is indubitable that the treatment cures. Not always — but a goodly per cent. So what we want to know now is: What per cent? And is the cure permanent?

That's what the doctors want to know, too. But they can't know yet. Two years is not permanent. Nine years is not permanent. (Still, it's nine years to the good, isn't it?) Yet those are the only figures we have to go on.

For the treatment was not given in this country until 1936. (You can imagine in what condition and how difficult of access are the reports from Germany and Austria where the treatment started.) In 1936, the insulin shock treatment was introduced in the United States almost simultaneously at three hospitals — at Worcester State by Dr. Cameron and Dr. Hoskins, at Harlem Valley by Dr. Ross, and at Bellevue by Dr. Bowman and Dr. Wortis, all before the arrival in this country of Dr. Sakel. Since then it has spread to many other hospitals — and the reports are still coming in.

Karl Bowman, long Director of the Division of Psychiatry at Bellevue, now at Langley Porter Clinic — what has he to say?

"In cases of less than six months' standing," he said in one of his early reports, "our results are striking — we had 22 out of 28 cases (78 per cent) *fully recovered*, and the large majority of chronic cases have benefited in varying degrees. Even in cases of fairly long standing, a year and a half, we have had 69 per cent recoveries and a good per cent of improvements.

"My present position on insulin is this," said Dr. Bowman in May, 1941. "When I first heard of it I was skeptical. When I first tried it, I was enthusiastic. Today it is my treatment of choice for schizophrenia. Here at Bellevue we are getting excellent results, with only one out of five relapses, and we have very high standards of recovery. We are not satisfied with a mere 'parole,' nor even with 'social recovery.' We expect a patient whom we pronounce in complete remission to be able to function as before in his former occupation. Some of our patients do even better. One, who had been very sick, got a job as secretary to a psychologist who lectures on *dementia praecox* — and the psychologist doesn't even know his assistant was once a mental case.

"Today we are not, as we were at first, overcautious. We dare, when this is indicated, to give shocks sufficiently deep and

long to accomplish the best results, but we likewise find that the best results are sometimes obtained with lighter shocks. All this suggests that we are still seeking the best ways of giving insulin. Also we are learning to vary the treatment in many ways and this flexibility adds to its efficacy."

Today, after ten years' experience with it, Dr. Bowman is still a strong advocate of the insulin shock, although perhaps feeling more certain that psychotherapy should be used in conjunction with it.

Dr. Joseph Wortis, then of Johns Hopkins, reviewing the statistics in 1939, found that reports on thousands of cases were almost unanimously favorable, not half a dozen being actually negative.

"Some psychiatrists have the impression that the shock treatment with insulin is on the wane," he said in a 1941 interview, "and that the figures are not as favorable today as when it was first introduced. On the contrary, they get better as the experience and ability of those giving the treatment increase. Recent reports I have examined give even better results than those of 1939. This treatment has run the usual course of medical innovations. At first wild enthusiasm because it certainly did cure, then disappointment and skepticism because it didn't cure everyone, and now finally a fair estimate of its value — which seems to be that it is without question a remarkably effective therapy within certain limitations."

One report, made in 1942 and covering 106 cases at the Pennsylvania Hospital, shows 63 per cent recovered or greatly improved, 42 per cent of whom were still well at the end of two years.

One of the later reports (1945) is that of the New Jersey State Hospital at Trenton on well over 1000 psychotic patients who completed a course in insulin therapy. Of these, 81 per cent were considered recovered and 68 per cent never had a return of their illness. Dr. John Taylor's report states that they are convinced there that shock therapy offers the best method for rapid improvement with a higher per cent of releases than any other method yet devised. A comprehensive study of

1128 patients treated with insulin shock in the New York State Hospitals between 1937 and 1942, although not so favorable, still shows such substantial results as to justify the treatment. The Governor's special commission ends its report by recommending that every case of schizophrenia entering a state hospital be given the insulin shock treatment.

In an earlier report prepared for the American Psychiatric Association, covering the nineteen New York State Hospitals, and based on 1757 cases of dementia praecox treated with insulin, a total of 63 per cent showed varying degrees of improvement — and these figures include "a large proportion of chronic cases" which no doctor (except perhaps Sakel) really expects to cure.

Now the significant thing about the figures from these nineteen state hospitals is the tremendous variation from one hospital to another. One is obviously a good place to take a schizophrenic relative for the insulin shock treatment — and another decidedly is not. The percentage of improvements varies from 85 per cent to 35 per cent. A variation from 85 per cent improvements to only 35 per cent is, to say the least, startling. Imagine it in profits in your business. Imagine it in German casualties versus English. Imagine it in your income tax. Imagine it on your child's report card. Fifty per cent is a lot of difference anywhere — the difference between success and failure.

And what makes this difference in results with the insulin shock treatment? Partly the type of cases treated, partly the problem of diagnosis, but chiefly the *men behind the treatment*. Not that some are better doctors than others, but that some are more skilled and more experienced in this particular technique. Dr. John R. Ross, who prepared the report on the nineteen state hospitals, explains it thus: the men who fail are not using Sakel's technique, the only method which gives the proper length and depth of coma. The only resemblance their treatment bears to his is that both start with insulin and wind up with glucose.

Some men explain this variation differently. To reports of a higher per cent of recoveries, shaking their heads, they say, "Claims to such high rates of recoveries sound better than

they are. Hospitals like to get rid of patients. They want to show cures in order to command bigger appropriations. . . . The cases they treat may not all be schizophrenics. They may be only hysterics. It's not always easy to diagnose these patients. . . . Dr. Sakel's own figures — 88 per cent recoveries? Perhaps they are selected cases, with illnesses of only a few months' duration."

Not necessarily dogs in the manger, not necessarily men envious or stupid or pigheaded. Just doubting Thomases, just the medical profession being conservative, up to its old, not unlaudable practice of saying, "You'll have to show *me*."

As for Dr. Sakel's "selected cases". . .

"Some time ago," Dr. Sakel related to me, "I was called to a psychiatric hospital to see a patient, a young girl. It was the mother, as usual, who had come to me. These mothers! You would think in time they'd become resigned. Never! A straw is enough for them to cling to. In this case, *I* was the straw.

"I think I have never seen a more hopeless case than that girl. She had degenerated to an animal, had been so for years. Three years before she had had the insulin treatment, with no improvement. I was determined this time not to be persuaded. I *would* not be persuaded.

"And I *was* persuaded. I gave the treatment, with every twist and turn at my command. I kept it up for three months (then usually my limit) and I could not budge her. I resigned.

"The end? Only the beginning. A mother at your door, in your office, in tears, day and night! . . . I continued the treatments.

"That girl must have been very pretty once. That only made it more horrible to see her as she usually was, foam on her lips, snarling, clinging like an animal to the bars of her bed.

"I went on — hopelessly. I left no trick I had ever learned untried. Nothing touched her, not for a moment. She was gone beyond reach. . . . Four months I kept at it, five, knowing I was beaten.

"Then, one day, late in the fifth month, came a flicker of sanity. Gone the next moment — but unmistakably there. Then

I really worked. Then I knew what fighting for a soul really meant. And day by day there was an almost imperceptible improvement — five minutes of sanity, ten, half an hour, a day!

"Today that girl is a brilliant figure in society. She has been completely well for over seven years.

"So — how is one to resist a mother?"

No, Dr. Sakel's cases could scarcely be called "selected."

The man who first worked this miracle looks beyond it.

"The physiological shock, yes, that is a good thing," he said to me. "But if I had not discovered it, someone else would have. It was, as you Americans say, 'in the cards.' I think that something else I have helped to do is far more important. Dr. Foster Kennedy once said, 'Whatever the verdict of the next decade on Sakel's contribution, we shall not again be content to minister to a mind diseased merely by philosophy and words.' That is what I mean. If I have helped, through the shock treatment, to bring psychiatry back to the physiological approach, then I am satisfied. Insanity is a *disease*, as cancer is a disease; it has a physiological basis; it must be treated medically. For each type of insanity we must try to find the pathophysiological cause, and attack that. We had gotten too far away from this fundamental truth. We must go back to it. This is the direction psychiatry must now take."

And now we come to the most amazing part of the whole story. We have seen the miracle take place, but you remember that second question young Sakel asked himself, back in 1927? "*How?*"

When a man or woman goes down, during that deep insulin shock, to the gates of death and then comes slowly back, something extraordinary happens. Of this journey, unlike any other, we shall now hear.

## XI

# *The Insulin Hour*

IT is 7 A.M. — “the insulin hour” the world over. Those who receive this treatment have a long day before them and they must start it without so much as a cup of coffee.

In charge of Dr. Train we enter the Brooklyn State Hospital which operates the largest single unit for the insulin shock in the country.

It is a huge hospital — corridors a block long, a room wide. At each end of the hall is a big ward, its narrow iron cots ranged along the walls and down the middle. The doctor’s desk is at one end, and scattered about are wheel tables holding glass funnels attached to yards of red rubber tubing, huge pitchers of a molasses-and-sugar mixture, hypodermic syringes seven inches long with two-inch needles, smaller hypodermic syringes with mercifully smaller needles, bottles of insulin, adrenalin, glucose — everything that will be needed, and needed in a hurry.

Thirty beds in one ward, a man in each. Thirty beds in the other ward, a woman in each. Brown heads, black heads, blond heads — not a single gray head. This is the disease with a predilection for youth — the insanity of youth, it is called, dementia praecox. There is a girl of fifteen in the women’s ward, a man of thirty-five in the men’s. That is about the age range — and most of them are in their twenties.

Off at one side of the block-long hall is a small room containing one bed.

"We'll go in here," says Dr. Train — "less confusion than in the wards. Bring in Anderson."

Two men bring in Anderson.

Anderson is in a strait jacket. With difficulty they get him into bed, twist a sheet about his shoulders and tie it to the head of the bed, another around his feet and tie it to the foot of the bed, a third across his thighs.

The doctor gives the insulin hypodermic. Very soon Anderson is quiet. In an hour he is drowsy. In three hours he is in deep coma. He has started on that strange journey. A journey, not in space, but in time. A journey back to the beginnings of time.

He reaches the end of that journey. His eyes are still open but he sees nothing. The doctor flashes his hand before his eyes but the lids don't flicker. He touches the eyeball and still the lids don't respond. The last reaction to outside stimuli has disappeared. This is close to death. Closer than that they dare not let him go.

"We'll bring him out now," says Dr. Train.

A nurse hands him the glass funnel with its yard of rubber tubing. The tube is inserted into Anderson's nostril, pushed down until it reaches the stomach. The molasses mixture is poured in. As the sugar reaches the blood stream, Anderson turns back from death. It is evident in the flutter of the eyelids, in the almost instantaneous drying of the perspiration in which he has been bathed, in the cessation of the flow of saliva. He returns, not slowly, as he went, but swiftly, in fifteen minutes.

Now when the doctor raps his head, Anderson's whole body twitches convulsively. He reacts *fully*, a phenomenon abnormal and primitive. The normal human being reacts only with the muscles necessary for adequate response.

As we watch come sharp contractions of the diaphragm, producing forceful emissions of air, a whalelike blowing. Simultaneously the body, unbound during coma, begins to roll from side to side, the arms reaching up and circling in a rhythmic motion, undeniably the motions of swimming.

"What Sakel calls the piscine stage," says Dr. Train.

The swimming movements abruptly cease. In a few moments his lips begin to move, at first vaguely, then in an unmistakable sucking motion, as of a young animal suckling.

"Now he will respond to the Babinski and Hoffmann tests," says the doctor.

He draws a key from his pocket and strokes the sole of the naked foot. Instantly the big toe separates itself from the others and rises. The other toes fan apart.

"A reversion to the monkey stage. Babies show the same reaction, which is normal in infants and monkeys but not in adults. . . . Look."

The man's hands are reaching upward, they encounter the iron bars of the headboard, the fingers curl around them.

The doctor with difficulty pulls loose one of the hands and lays his own finger on the palm. At once the fingers curl tightly around it.

"A purely simian reaction. At this stage he will grasp anything his hand encounters. This reaction also is normal in infants and monkeys but not in adults. At this point not only his hands and feet, but his whole body and facial expression are simian. His lips protrude, his nostrils dilate. . . . Now he is moving forward in time—he is primitive man. Strong, uninhibited emotions convulse his features. He suppresses nothing, he hides nothing. Only the savage shows his emotions so fully. Now his lips curl back, his eyes blaze, he snarls, he is angry. At another time he might be exultant or fearful, but always fiercely and primitively. Listen. What do those cries remind you of?"

They would remind anyone of Tarzan.

"Exactly—Tarzan. He continues to move forward in time. In a few moments now he will be able to speak. . . . Hello! Hello, Anderson!"

The man's eyes focus slowly on the doctor's face. He seems gathering himself for a supreme effort, the final surge toward humanity—speech.

"Hel-lo," he at last brings out. "Hel-lo, doc-tor."

He speaks haltingly, with enormous effort. But even so, a strange fact is at once evident. Anderson has not come out of this shock the same man he went in. There is a change, noticeable at a glance, in his whole personality. The look in his eyes is different. The sound of his voice is different. His thoughts, his emotions, his attitude toward people, have undergone a complete change.

The doctor speaks to him again.

"What is your name?"

"What — is — my — name?"

"Yes, what is your name?"

"Ger — ard."

"Gerard what?"

"Ger — ard . . . Gerard . . . An-der-son."

"How do you feel?"

"I feel — fine."

With each moment the words come more freely.

"Do you want your breakfast?"

"Yes — I want — my breakfast."

"Touch your right eye with your right hand."

"My right eye — with my right hand." He does so.

"Now the left eye with the left hand."

He repeats the words, carries out the order slowly.

"You are much better, aren't you?"

"Much better."

"No confusion."

"No con — fu — sion."

"Where are those voices you heard?"

"Gone. There are no voices. They were only in my imagination."

"Right. How about the earth rays that get connected under the earth and focus on your head?"

"I don't understand about that. They are still there I guess. I feel them in the evening. The ships come then, too, and I have to wave them away. When I get excited and nervous I can smell the whole earth and everything on it. I can't smell anything now."

"Right. Now you'll have your breakfast and then get up and dress."

He pulls himself up in bed.

"Dr. Train, I don't like this insulin treatment. I don't like the way I feel when I'm waking up."

"But it's doing you so much good."

"Yes. . . . Will it soon be over?"

"In a few weeks. Don't worry about that."

"I want to go back to work. They're holding my job for me."

"You'll go back. You help us and we'll help you. Agreed?"

A pause.

"Agreed."

His eyes follow us from the room.

"Anderson is a paranoid dementia praecox case," says Dr. Train. "The change in him immediately following insulin treatment is extraordinary but he will be bad again this afternoon. Still he hangs onto himself a little longer each time. The prognosis is good. . . .

"The really curious thing about Anderson's case is the clearness with which he illustrates, almost step by step, Sakel's theory that during coma the patient retraces our biological evolution, from man to fish as he goes into coma and from fish to man as he comes out. And perhaps it isn't so strange as it sounds. In its development the human embryo passes through these same stages — fish, amphibian, monkey, great ape, primitive man. Jung showed that the mentally disordered often regress psychologically, not merely to childhood stages, as Freud pointed out, but to primitive stages of racial development. What is so remarkable then about the fact that, with the higher cortical centers, those most recently acquired by man, subdued first in the insulin coma, and the successively lower centers progressively stupefied as the coma is prolonged, the human being should retrace the steps of this evolution back to his beginnings?

"When they wake, they remember nothing of their adventures. The doors, as they return, are one by one closed behind them. They have no tales to tell, but sitting beside them as

they make that journey, one can follow the story of evolution. At least that is Sakel's theory. Now shall we go into the men's ward?"

We enter the men's ward. The patients are waking up. Some in the lighter pre-shock phase of the treatment are able to sit up and drink the molasses-sugar mixture. Some are being fed by tube as Anderson was. Some are in so deep a coma that glucose or adrenalin must be given intravenously. In this event, the return to consciousness is so swift (a matter of seconds, not of a quarter or half hour) that it is startling. Long ago, before insulin shock was dreamed of, Stevenson wrote a story in which a man takes a drug and is transformed from saint to demon, takes another and is converted from demon back to saint. Today the transformation of a Jekyll-Hyde is no longer fiction. It is an experience which these men and women, into whose veins is injected insulin and then adrenalin or glucose, undergo daily.

Here is a man who, before treatment, was utterly confused, whose words were an indistinguishable jumble, who now, in the snap of a finger, comes out of shock completely lucid, looks up, smiles, and says, "Good morning, doctor."

Here is another who ordinarily neither speaks nor turns his head nor looks at anyone, who, before the needle is out of his arm, says, "Will my wife be here today?" and reaches for his cup of coffee. . . . One cannot escape the impression that the hypoglycemia is consistently forcing psychic changes — and in a definite direction.

We pause beside the bed of a curly-haired youth, twenty-one or two, perhaps. He is bouncing about and playing with his bedcovers.

"What is your name?" the doctor asks.

"Johnny, Johnny, Johnny, John —"

"How old are you?"

"Five. Johnny is five."

"Too old to play with your bedcovers, John."

"Not old — not old — just Johnny, Johnny, John —" He catches sight of a stranger and at once, like a child, he becomes

shy, turns away his head, puts up his arm to shield his eyes. . . . We move away.

"That is one phase of temporary retrogression," Dr. Train comments. "He has not come completely out of shock yet. He lingers in a childhood stage. You saw the infantile, typically clumsy co-ordination of his movements. That is a type of clumsiness which can't be successfully imitated by adults. Just now his vocabulary is very limited. He keeps using the same words to answer various questions, just as a child does. But as you saw, far from being embarrassed by his limited vocabulary, he is very pleased with himself, like a child who is proud that it knows so many words. If I used any three-syllable words in speaking to him, he would merely stare, not comprehending, and if given a command he couldn't understand, he would simply pout or cry. In just a little while Johnny will be John Finlay and he will give you his correct age."

We move on to the bed of a blond Jewish refugee, also in his twenties. He is kneeling on his bed, his hands clasped in prayer. He gazes upward and his lips move continuously.

Most of what he says I don't understand, since it is in Yiddish. But then I hear two words I do understand — "*Schoen Amerika*." Over and over they are repeated — "*Schoen Amerika*" — "Beautiful America."

"We have five of these refugees in here now," says Dr. Train. "More coming every day. This man has returned to the adolescent stage. You can't tell what period they will linger in — sometimes, perhaps, as the Freudians say, the one in which they were the happiest. This chap suffers from feelings of depression and guilt. See — he is wringing his hands, he is saying how guilty he is, reciting all the wrongs he has ever done, when more likely it is the wrongs that have been done to him which have helped to bring him to this state."

Suddenly, in an agony of remorse, the Jew flings the sheet over his face, rocking back and forth.

"Epstein!" the doctor commands. "Epstein! Drop that sheet." Slowly the Jew lowers the sheet, looking about sorrowfully. "Just might try suffocating himself," the doctor says.

This is what we have come to see — this recapitulation of the past as the patient emerges from coma. We return to the doctor's office.

Dr. Terrence, in charge of the insulin treatment, who learned the technique from its discoverer in the introductory course which Dr. Sakel conducted at Bellevue when he first came to this country, takes over.

"Well, you have seen a beautiful case of philogenetic reproduction," he smiles. "Doctors like to use these big words sometimes. Not long ago I saw a medical announcement in the newspapers.

"We have under our care Mr. Vladimir Horowitz who is convalescing from a traumatic tenosynovitis of the flexor digitorum sublimis and profundis muscle at the metacarpophalangeal joint. It is our opinion that he cannot resume practising and playing in concerts before January.'

"It took me a few minutes to work that out myself. Mr. Horowitz, the noted pianist, had an injured finger. . . . Some doctors are like that.

"Philogenetic reproduction is a big word which merely means the recapitulation of evolution during insulin coma. Until you have actually witnessed it, it sounds fantastic, doesn't it? But once observed — and frequently it takes no trained eye to see it — it is unmistakable. These patients do demonstrate in coma primitive — yes, animal — reactions, apelike, even fishlike. The cortex being temporarily knocked out by the drug, they revert to subcortical behavior. In other words, as they slip into coma, they lose control of the higher brain centers first, then successively of each of the lower. Naturally their behavior becomes less and less human. That is the explanation offered by Sakel of these strange phenomena — subcortical behavior on an evolutionary scale.

"Anderson is a beautiful case of fleeting reversion to primitive behavior. He shows so many evolutionary stages and shows them so clearly. These stages are in evidence only when the patient gets the sugar slowly, by drinking or by tube, so that he comes up gradually through the various cortical levels. Of

course, when they are given glucose intravenously, they snap out of coma so quickly that there is no time for any of these phenomena.

"How does insulin work to bring about recoveries? We don't know. Oh, I can give you a theory, like any other doctor working in this field, and a very fascinating theory it is, with plenty of evidence to support it, but I won't take oath that it won't be outmoded tomorrow. It is the theory of the murdered neurons.

"Fortunately, very few patients die in insulin shock. But the brains of those who have died and which we have examined show this: that frequent or prolonged insulin shocks sometimes destroy isolated neurons in various parts of the brain.

"On the face of it, that looks bad. But, as Dr. Tilney pointed out, we use only one quarter of our brains. We can lose a lot of neurons and still go on thinking as well as ever. Of the millions of neurons in the brain, thousands could be spared and our friends would not miss a single flash of our accustomed wit or learning. So the theory is that it is this destruction of certain brain cells which brings about the recovery of normal brain processes. Perhaps by an all-around functional readjustment of the central nervous system endeavoring to compensate for this loss or adapting itself to the new conditions in the nervous system. Perhaps. We don't know.

"It's a curious situation — and of course entirely unorthodox — when we have a cure for a disease and don't know the cause. That's the situation with insulin therapy. We don't know what schizophrenia is, we don't know how insulin works — we only know it does. And we know one scientific principle at work here. It is this: that insulin produces hypoglycemia (sugar starvation), hypoglycemia produces shock; sugar (in the form of glucose or a molasses mixture) ends the shock just before the shock would otherwise kill the patient."

Dr. Clarence H. Bellinger, Superintendent of the Brooklyn State Hospital, says: —

"Insulin is the most efficacious form of treatment for schizophrenia to date. Of course insulin will not give a man a new mind any more than it will give a diabetic a new pancreas, but

it will often restore to him the mind he has lost, good or bad. After the skill of the physician, in the prospect of cure, comes the previous character and mentality of the patient and the duration of the illness. As in cancer, the earlier the disease is treated, the greater the chances of success.

"Up until June, 1942, we had completed treatment of 1852 patients, 1372 of whom were sufficiently improved to go home. Of these, 402 later returned to the hospital, leaving a group of 907 who continued to adjust well in the community—a total of 52 per cent. We have for years treated sixty patients simultaneously, always with the same excellent results."

Out in the corridor once more.

It is visiting day, and mothers and wives and fathers and sweethearts are here, mingling freely with the patients.

Someone drops a big soda bottle and as it bursts with a loud report and a splattering of glass, you should see how many of these sick people run with broom and pan to clean up, anxious to be like real folks, busy, useful, *needed*.

Temporary, of course, this afternoon lucidity. They'll slip back almost to where they were early that morning, most of them. But tomorrow they will receive the treatment again, and after a number of tomorrows many of them will walk out of here into a world that is once more a sane, good world to live in.

But we are of a scientific bent, you and I. We are intrigued by that idea that though insulin shock cures, the doctors don't know how. Is this true? Does no one know, not even Dr. Sakel? The idea that a mind completely deranged can be restored to sanity by this chemical treatment is so astonishing that we, who are fascinated by the processes of the mind, want to know more about how it works. But before we come to that, perhaps we should pause a moment to consider a little what this baffling illness is.

Like hysteria schizophrenia takes many forms. Only where hysteria *imitates* different illnesses, schizophrenia *is* different illnesses. Now it gives us the classic raving maniac, now the indi-

vidual who lies waxlike and speechless. Now it abases the intelligence to a point where thinking ceases and now the intelligence remains, but instead of normal thoughts it is pre-occupied with all manner of delusions, obsessions, and hallucinations.

All of these people, however, have this in common — that they have an abnormal attitude and reaction to reality. Their feelings and behavior are no longer appropriate to what takes place outside themselves, however appropriate they may be to what goes on inside. Each lives in a world of his own creation which no one understands but himself. Therefore, more than any other of the mentally ill, they are strange and incomprehensible. The persistent persecution complexes and the delusions of grandeur of the paranoiac, the alternations of exaltation and black despair of the victim of manic-depressive insanity, we can understand and sympathize with. Not the silliness, the mutism, the indifference, the garbled talk, the shallow and unsuitable emotions of the schizophrenic. Of all the mentally ill, he is the most alien. An example?

In July, 1940, a quiet, shy little man, bald and flabby, clinging to the arm of a sad but self-reliant woman, a woman with a jaw, was seen for a while in and around a certain hotel in Budapest. Then they disappeared.

Twenty years ago you probably saw that flabby little man here in America. Perhaps you went one night to Diaghileff's Ballet Russe. Perhaps you saw *Le Spectre de la Rose* or *L'Après-Midi d'un Faune*. If so, you saw the greatest male dancer who has ever lived, a man whose incredible leaps appeared to go up twice as fast as they came down, seemed to suspend him in midair, and started the rumor that he used concealed springs. They were against God and gravitation, those leaps. And his mind, the mind of a genius, executed leaps and *entrechats* quite as astounding in the great ballets he created.

That was Vaslav Nijinsky — and now here he is, twenty years later, clinging to arm of his wife, his "Femmka" Romola, in that hotel in Budapest. For twenty years he has been a schizophrenic.

Shortly after the First World War he began acting strangely.

Once he went down to the village from his house in the mountains, holding aloft a cross and preaching to the villagers. On several occasions he was violent and on one occasion he flung his wife downstairs. He kept an audience waiting for an hour while he sat in their midst staring into space before he began to dance. He bought a dozen, two dozen, of anything he liked. He seized from his child any food he coveted. Then he would announce that all this had been a mere pretense of madness, a joke.

But at last it was seen to be no pretense, no joke, and he was sent to an asylum. He came to believe he was God. He often didn't recognize his wife. He was filled with delusions. Finally he ceased to think.

All this was long before the discovery of the insulin shock treatment.

Then in 1938 that obstinate woman, his wife, heard of Dr. Sakel and came to America to consult him. She is a woman who has never comprehended the meaning of the word "no." (She married Nijinsky in spite of Diaghileff, in spite of the fact that they didn't speak the same language, in spite of the fact that he was a world-famous dancer and she a nonentity, in spite of the fact that though she was introduced to him a dozen times he never remembered her and never spoke to her.) Dr. Sakel said *no* so many times that he grew weary of it. Then he got on a boat and went to Europe with her.

That might have led to something. True, Nijinsky had been ill for almost twenty years, but there had been cases . . . Dr. Sakel began treatment. Then — Munich, and he was forced to return to America before completion of the course.

However — there was Nijinsky, out of an asylum, in that hotel in Budapest. Not well, but better. Enough better so that he knew his wife, liked to trot about with her, and no longer believed he was God.

And what was that willful woman up to now? She was, by every device known to diplomacy (and a few known only to a woman), endeavoring to get passports and permission to bring her husband to the United States to continue those treatments.

She was meeting nothing but rebuffs. But a woman like that treats rebuffs as though they were promises.

For over twenty years she has cherished the idea that some day, somehow, he will be returned to sanity. As a girl she used to pray, "Thank you, my God, that I have lived in this century to have seen Nijinsky dance." She probably still does.

So perhaps some day, somehow —

And now how does Dr. Sakel explain the action of insulin in returning the mind to normal? As he went out of the door of his room that day in 1927, he knew that on some future day he must answer that question. Until he could, what he was doing was still, though he might cure his thousands, little more than witch-doctoring. He hasn't yet arrived at an answer which science, or he himself, accepts. But he has a working theory.

"In the insulin shock treatment," he says, "I got hold of the wrong end of the rope. I hit upon the cure without knowing the cause, a totally unscientific procedure. But just because we arrived at the end of the journey without ever having started at the beginning, is that any reason we should abandon it, especially when working with so baffling a disease as schizophrenia? In this treatment the practical application is much better than the theory behind it. My original explanation was naturally rather sketchy. I have gradually amplified and amended it but it is still not entirely satisfactory — it may even not be the correct explanation at all. Granted. I still want to go on curing schizophrenics."

He is a quiet and serious man, Dr. Sakel, but he is no stuffed shirt. So young a man, achieving such fame, might be expected to toss the mane a bit. Not Sakel. He is completely uninflated — unimpressed and unimpressive about his achievements. Perhaps there is no Park Avenue or Harley Street for doctors in Vienna — I don't know. At any rate, a smart address with outlying anterooms and oversize furniture is no part of his equipment as a noted specialist. One room in an unfashionable hotel seems to be all he needs to carry on a large practice. It was much the same in Vienna where visiting notables were always

trying to get past him to Dr. Sakel, mistaking him for the famous specialist's secretary and his modest office for an ante-room.

"The working theory I hold at present is this," continues Sakel. "The nervous system constitutes a vast and intricate system of communications with the brain as a central clearing-house. A reaction of the nervous system is a response to stimuli, traversing certain intracellular pathways. Now nothing is clearer to me than that, in certain forms of insanity, it is this communication system which is disorganized.

"These 'pathways' are not anatomical or physiological. The word is merely my attempt to express the abstract in terms of the concrete. I use it symbolically to indicate the conception of nervous impulses traveling in certain directions.

"During the course of evolution, man has developed certain ways of reacting to stimuli, patterns of behavior, we call them — for example, the instincts. Each of these patterns of behavior is, I assume, associated with certain pathways in the cells. Some of these pathways were laid down in the cells very early in evolution; others came later.

"In any general injury to the nervous system, the most lately acquired cells and the most lately acquired pathways in older cells, being the youngest and so the most vulnerable, are the first to be impaired. Therefore, our most recently acquired nerve centers and patterns of behavior, being associated with our most recently acquired cells or pathways in the cells, are the first to suffer. According to the severity of the injury, during the course of a mental disease the youngest and the next youngest will be impaired in succession until at last one of the more ancient pathways resists and continues to function normally. The individual then reacts at that primitive level of behavior. This explains how a mentally disordered person may regress to childish or primitive conduct. His more highly developed pathways and reaction centers have succumbed, and his behavior is controlled by the older, lower centers.

"The pathways of the instincts, tracked deeply into the ancient parts of the brain in the course of millions of years, are

naturally more resistant to injury than the pathways of civilized patterns of behavior. The instincts are older than human behavior, the emotions than reason, concrete thinking than abstract. We see, therefore, why certain types of schizophrenics regress from abstract to concrete thinking, from civilized to instinctive behavior, from the dominance of reason to the dominance of emotion.

"The hallucinations and delusions of the insane may likewise, I believe, be explained on this ground of the short-circuiting of stimuli via inadequate pathways to wrong perception centers.

"Each sense has its own organ and sensory pathways. Sound, vision, smell, and so on, travel over their own special nerve tracks. We don't hear with our noses or see with our ears. Yet that is just what may be said to happen to a schizophrenic.

"Say he smells something. This sensation travels along its own proper pathways till it reaches the brain — and then a strange thing happens. Near the end of the pathway, it strikes a short circuit. The sensation of smell abruptly leaves its own pathway and leaps to another, say an auditory pathway, and thus reaches the auditory center. The schizophrenic then hears a smell. It may also, of course, reach the olfactory centers and then he both hears and smells it. In like manner, sound stimuli may cause visual images and, even more often, sight stimuli may cause sounds. A demented girl sees tattooed on her arm — *sees*, not *imagines* — the mark of his possession which an absent husband has caused to be placed there. A short circuit in the transmission of stimuli is causing reactions over inappropriate pathways. Result — hallucination.

"Thus, in my opinion, it is the dysfunctioning of nerve cells and the consequent faulty transformation of energy, resulting in the short-circuiting of impulses to inappropriate and primitive pathways, which produce the disorder we call schizophrenia.

"Now how does the shock treatment cure this condition?

"To effect a cure we must restore the normal functioning of the cells and so the use of appropriate pathways. So what do we do? We artificially, by the use of drugs, attack the nerve cells,

with the idea of forcing them, in self-defense, to mobilize all their reserve energy to meet this attack. We hope that the energy thus mobilized will exceed the amount needed to resist our attack and that this excess energy will be sufficient to overcome the original injury. By repeating these attacks, again and again compelling the nerve cells to mobilize in order to ward off this threat to their survival, we hope to force them to resume normal functioning. To this end we invade the enemy territory, 'the alien land of schizophrenia,' with two offensive weapons — coma and convulsions. These are both grave dangers to the cells. They must fight back desperately in order to survive.

"The epileptic seizure is the artillery, the hypoglycemia is the infantry in this attack. Military authorities tell us that the artillery never conquers and occupies hostile territory. It merely blasts the way for the infantry. Thus the epileptic fit may remove the symptoms with dramatic swiftness, but even when it succeeds in this it does not usually hold these gains. It does not, in most cases, remove the cause and therefore is not lasting in its effects. The coma works more slowly but more surely. Here the attack on the brain, including anoxia (oxygen deprivation), is not so acute but it is of longer duration than with convulsions, and that may account for the difference in the results obtained by these two weapons.

"Like the artillery, the epileptic seizure often paves the way for the insulin coma. It unlocks gates and overthrows barriers. But it is the coma, together with various other effects of the drug insulin, which chiefly acts upon that condition of the cells which manifests itself as a psychosis. Improvement after an epileptic attack is more apparent but it is shallower and often transient. Its gains must be consolidated by hypoglycemia. Now how, actually, does this sugar starvation act to normalize the functioning of the nervous system?

"I believe that it acts, among other factors, by setting up a blockade which shuts off not only food but also the oxygen which the brain must have in order to function. Like any organism that is starved, the cell carries on temporarily on its re-

serves. And now again we see at work the law that the most recent or active cells and pathways are the first to be impaired. In schizophrenia the cells which are producing the abnormal symptoms are the most active. The normal cells and pathways, being subdued and therefore dormant, must and can get along with less nutrition and so are not affected until some time after the overactive abnormal cells have been forced to function normally or have been starved into inactivity.

"By repeating this 'starvation' treatment day after day, we strengthen the blockade, and gradually the dysfunctioning (misbehaving) cells are permanently restored to normal and the inappropriate pathways are solidly boarded up and marked, 'Closed — Detour.'

"Well, that's the gist of the story as I see it. Any day something may be discovered which confirms or refutes it. Meantime the physiological shock works. Whether this theory or some other is the correct one, we can still go on rescuing minds and souls — and that's really our job, isn't it?

"Of course, once we have restored a mind to normal, that is not the end. The convalescent mind, like the convalescent body, needs special care. Usually the patient must return to the environment in which he became ill; every effort should be made by his relatives to help him to adjust to it. More than tougher minds, he needs understanding and help. Someone should take the responsibility of seeing that, for a time at least, life is tempered to his vulnerability. }

"Often the attitude of the returned patient's relatives is his most serious handicap. What is a doctor against a wife? All *his* assurances that the patient is well will avail nothing against the shrugs and glances of the family who may thus let him see that they still consider him irresponsible or actually dangerous or may clearly show him that they feel indifferent or even antagonistic to him. Again they may make it all too plain, during his period of readjustment, that he is a heavy financial liability or they may refuse him his old position in the household. Or they may err through kindness.

"I heard of such a case recently. The patient, a war veteran,

was occasionally given leave from the military hospital, and the wife, failing to take seriously her husband's threats of suicide, failed to supervise him as she had been warned to do. Finally she came home one day to find he actually had committed suicide. In the case of mental patients we surely are our brother's keeper. I heard a story the other day which illustrates this point beautifully. The Chinese seem to understand these things better than we do.

"The auditing department of the Pan-American Airways Company received from the constabulary of Wahn-sien, China, a bill, in Chinese characters on parchment, for 'board of one rescued soul — \$3.18, Mexican.'

"With rescued souls and their board, even at so modest a figure, the auditing department had no experience. The bill was shunted back and forth but no one — Ah, yes, there was a chap named Vaughn, Captain Vaughn, a pilot on the run between Miami and Rio di Janeiro, who had previously been in China opening up an air line from Hong Kong to Chungking. Perhaps Vaughn would know.

"Vaughn knew, all right. It all happened four years before. Flying one day to Chungking, he landed at Wahn-sien and, on attempting to take off, found himself up against the swift current of the Yangtze River. He called to the crowd on shore to catch hold of one of his pontoons, within easy reach of the landing float. The first to answer his call was a young Chinese maiden, more interested than the men in the progress of aviation — or perhaps the aviator. She flung her fair frail body with great enthusiasm but little effect against the plane, till, shamed, the men surged forward en masse and the celestial maiden was accidentally swept into the water.

"It was at once apparent that the young feminine enthusiast of Western progress had no chance against the swift current and that she was certainly going to drown. In spite of which, the thousands of Chinese on shore, 'with a much better appreciation of China's tremendous population than I,' as Vaughn put it, impassively watched her going down for the third time.

At which point Vaughn himself leapt overboard and saved her, to the intense indifference of the crowd. It took high-pressure American salesmanship to persuade an apathetic policeman to take the exhausted maiden off to a hospital.

"Months later, breaking his flight again at Wahn-sien, he was met by a policeman who thrust upon him a bill for the board of one rescued soul who from now on, it was intimated, would be his responsibility. Thereafter he was regularly sent a bill for this soul's support.

"This story is just a way of making my point that once a soul has been rescued by the doctors, it becomes, like the Chinese maiden, someone's responsibility. Most hospitals place their discharged psychiatric patients on parole, see them at regular intervals, and give what help they can. Some hold clinics for the relatives of patients in order to help them to understand the patient and assist him in adjusting. All that is excellent."

We have considered two views of the way the physiological shock works. There are many others — even to the theory that the patient so hates the treatment that he gets well in order to escape it, even to the theory that it is really "intravenous narcissism." (Needless to say, these last two were thought up by the psychoanalysts.)

As to the *why* and *how*, there is no consensus. It isn't, you see, as though only *one* thing happened during shock. That would be easy. But so many things happen. Not only are neurons murdered and new nerve pathways tracked, but several dozen other things happen, too. The heart increases in size, the oxygen metabolism, the blood sugar level, the endocrine glands, the respiratory organs, the skin — practically everything is affected. So how pick out the one particular change, or the particular combination of changes, which works the miracle? Some day, of course, this will be done, but today the most that can be unequivocally said is that practically all the explanations grant that schizophrenia is a physiological disease responding to physiological measures.

That's what the doctors say to themselves as they pump in-

sulin into the body, hoping to see the mind restored. That is their profession of faith. That is their credo.

And because they have believed this, and done this, for the first time in medical history, psychiatrists have erased from over their doors the words, "All hope abandon, ye who enter here," and have written up in their place, "Insanity is curable."

In a field where, only a few years ago, nothing was thought, done, tried, and "incurables" went their tragic way to complete deterioration unhindered, today is hope, today is almost certainty.

The treatment with insulin was an attack on the mental disease which is the foremost destroyer of mind, since schizophrenia claims about 60 per cent of all the mentally diseased in hospitals. But what about the remaining 40 per cent, which still adds up to some millions of victims throughout the world? What, in particular, of the next largest group, the affective disorders (so called because the disturbance here is predominantly emotional, not ideational), under which fall the manic-depressive psychoses, the second largest disabling psychotic state, and involuntional melancholia? As dementia praecox is the special enemy of youth, so these are the enemies of middle age, and from the point of view of sheer mental torture, involuntional melancholia at least outstrips schizophrenia.

True, the insulin treatment is also effective here and in some institutions is so used. But where a selection of cases must be made, due to limited facilities, it is the schizophrenics, who are lifelong patients and whose disease is progressive, who are the beneficiaries of this treatment.

But suppose a method were found, briefer, cheaper, and easier for the physician than the shock with insulin and peculiarly adapted to the affective psychoses?

We can't say that our next man deliberately set out to discover such a method (as a matter of fact he set out to do something quite different) but by reason of a mistake, an accident, and the usual amount of brains and sweat which must go into any great achievement, he did, quite as unexpectedly to himself as to anyone else, develop a treatment which appeared to be

made to order for the affective psychoses. It is a story which begins in Budapest, strikes a storm center in Münsingen, bounces off to Vienna, whisks off to Rome, and finally lands on its feet here in the United States.

First, Budapest in 1929 . . .

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XII

## *And the Devils Departed*

ON November 3, 1933, Sakel officially announced his coma-convulsion treatment for schizophrenia. Three weeks later, on November 23 (according to his own report), a young Hungarian, whether because of this event or not, began a series of experiments on animals with the same ultimate goal in mind, the cure of schizophrenia.

In 1933 Sakel had been treating schizophrenics for five years. The Hungarian had yet (again according to his own report) to treat his first patient on the first day of 1934. He treated him, to be exact, on January 2 of that year and he did not announce his method of treatment until one year later, in January of 1935.

Why all this to-do about dates, you are probably wondering. Because we now come to one of the epic wars of psychiatry and these dates are a deciding factor in one of its issues.

The advent of the physiological shock treatment was, as we shall see in a moment, no quiet and peaceful event. Its reverberations were heard round the world, creating division and dissension throughout the ranks of mental medicine. First of all it aggravated the growing opposition between the physiological and the psychological schools. Second, within the ranks of the physiological men themselves it opened up a new, wide breach, for many of them were, on various grounds, bitterly opposed to it. Third, it launched a minor war between those who, though convinced of its value, were divided as to the efficacy of two variations of the treatment — the classical shock

as originated by Sakel and a new version of shock developed by the young man of Budapest, about which we are now to hear. . . . Yes, it's quite a war.

Young Ladislaus von Meduna enjoyed (that's the word) browsing about the autopsy room at the Interacademic Institute for Psychiatric Research in Budapest — and he particularly enjoyed the brains. Hearts and kidneys were all right in their way but give him brains every time.

Here were the brains of cretins and here the brains of epileptics; here the brains of the victims of encephalitis and here the brains of schizophrenics. Fascinating to dissect, to subject to chemical tests, to study under the microscope, to *compare*.

How different this epileptic brain from this schizophrenic brain! Astounding, really. And constant, too, for every epileptic brain was *always*, in the same ways, different from every schizophrenic brain. Meduna saw that clearly in the beautiful preparations of the tissue of the brains of epileptics and schizophrenics made by his master, Karl Schaffer. To the end of his days he would think, as an artist thinks of having once gazed upon Botticelli's "Venus," of those classical glia preparations. . . . And for weeks and months he went around wondering about the significance of that biological antagonism between the two types of brain.

In death these two types of brain were utterly different, mused the young Hungarian, putting on his clothes and taking them off, brushing his teeth and drinking his coffee. And in life the two mental disorders were utterly different. Well now, it was logical to suppose, wasn't it, that the brains and the diseases corresponded? That being the case . . .

Here is where Meduna stepped off the solid ground of what appeared to him to be facts and walked out on the fragile, swaying bridge of theory, a bridge that has supported many a man of science until he reached solid ground again. Was it going to support Meduna now — or was it going to let him down with a terrific bump?

The bridge he flung across space was this: Because of these

observed facts, it certainly looks as though there were a biological antagonism between epilepsy and schizophrenia. As between light and darkness. As between heat and cold. The two never go together. When one comes in, the other steps out.

These antagonisms are not unknown to medicine. We have this same sort of biological antagonism between cutaneous tuberculosis and pulmonary tuberculosis. They never *both* attack an individual. They are either-or diseases.

Epilepsy and schizophrenia are either-or diseases.

If that is so, then — then the invariable characteristic of epilepsy, the fit, should drive out schizophrenia. Isn't that so?

If this surmise is correct, all we have to do, to cure schizophrenia, is . . .

This was startling — and Meduna, being young, was properly startled. Did he dare? For a long time (this was, he reports, in 1929-1930) he went about revolving this idea in his mind. And he didn't quite dare.

We must remember that at this time (before Sakel had officially announced his shock treatment) there was a frightening apathy among most psychiatrists, and particularly European, concerning their own self-chosen job, the treatment of insanity. Not that they were indifferent — they were merely helpless. If they were new to the job, like Meduna, they really suffered over their own inadequacy. Faced with a schizophrenic, Meduna relates, he was invaded by an agony of despair. What could he do for this unfortunate creature? What could anyone do? A little psychotherapy, a little physiotherapy, a little occupational therapy — what did it amount to? It amounted to little more than imprisonment for these stricken individuals to prevent their harming themselves and others.

"We self-styled psychiatrists," he, like so many others, probably reflected, "what fine fellows we are! Setting up to cure the incurable! We are nothing, for all our degrees and medical training, but asylum keepers with diplomas. The best we can do for these unfortunates is to treat them kindly — which we by no means always do."

He was right there. Van Gogh was incarcerated in an insane

asylum that was like a third-class waiting room in a railway station. One common stove, one lamp, a cot for each man.

"The lunatics always wear their hats, spectacles, canes, and traveling cloaks just as though they were on the point of leaving for somewhere," van Gogh wrote his brother Theo.

A doctor came once a week, did nothing. There were no attendants or nurses. The inmates were advised not to read or talk for fear of bringing on an attack. They were forbidden to play or work, both considered conducive to "churning up the brain." Van Gogh was refused permission to paint — he who had no life but painting.

"I know," said van Gogh, "that a painter is too much absorbed in what his eyes see, and not sufficiently master of the rest of his life. But does that make him unfit to live in this world?"

Nijinsky, says his wife, was either neglected, badly nourished, or ill-treated in all but one of the carefully selected sanatoriums in which she placed him. No more was done for a genius than for a congenital idiot.

That was the condition — and the hope — of the insane only a few years ago. Then a new wind swept through the world. There came men who looked at old problems with fresh eyes. Men who tried new things, not knowing they were beaten before they started. Sakel — Meduna . . .

We come now to those two dates in November, 1933 — the third, when Sakel announced his discovery, and the twenty-third, when Meduna started his experiments. Whether or not the young Hungarian knew of Sakel's work when he began his researches does not appear on the record. He maintains that he did not, and upon this bases his claim to an independent discovery.

On the twenty-third Meduna repairs to his laboratory and starts his preliminary experiments with animals.

Now there were, there always had been, two factors involved in Sakel's treatment — coma and convulsions, both effective. Which was the more effective he could not himself have told you. He had never attempted to divorce either from the other

and compare their relative values. It was a happy marriage. Both parties to it seemed to him necessary and valuable.

But it occurred to Meduna (and he may have been acting entirely on his hunch, based on his either-or theory, that convulsions are antagonistic to schizophrenia) to attempt to fight schizophrenia with convulsions *alone*. So he set out to discover how to produce a fit *at will*. Insulin, the basis of Sakel's treatment, might bring on convulsions or it might not. True, he had sometimes, as he had announced in his first report, used additional convulsant poisons such as camphor and metrazol *in conjunction with insulin*, to induce a fit when it seemed desirable. But he had never used these drugs *alone*. And even *with* them he had never been able to produce a fit at a given moment. Even with the best of them, metrazol, it was always a question *when* he would get a fit. And sometimes a fit was badly needed. But there was one factor Sakel had overlooked and Meduna was to discover it.

One day, only two months after Meduna started his animal experiments, confronted with a schizophrenic, he said to himself, "What if I should try giving this poor devil epileptic fits by injecting camphor? I've been doing it with guinea pigs and they're none the worse for it. What has this man to lose? Maybe twenty years of insanity, maybe forty. Perhaps *not* to try would be criminal negligence. Yes, it seems to me —"

So he tried. And if it did no good, it did no harm. And there was just a faint hope. So he tried it on another — and another.

Till about a year later, in 1935, he had treated twenty-six such poor devils. At the end of that time, what he chiefly had for his pains was a fine crop of *buts*.

He had used oil of camphor to bring on the fits. It produced the epileptic seizures all right — *but* not always. It produced seizures — *but* often very feeble, ineffectual ones. The patients often showed improvement — *but* there was no actual proof that it was due to these seizures. In fact, the longer he experimented, the more young Meduna was in a lather of confusion and doubt. And now he was far out on that spidery bridge of theory he had flung across the abyss of medical igno-

rance concerning insanity: "There is a biological antagonism between the schizophrenic constitution and the epileptic." It was less than a bridge — it was a tightrope, and it swayed horribly. But he went forward.

He tackled those *buts*. He must find a better fit-producing drug than camphor, work out a better procedure of giving it so that he could be sure of getting a convulsion *every time* — and an instantaneous and energetic one. He experimented with strychnine, thebaine, pilocarpine, metrazol (on guinea pigs first, of course), and one day it came to him: "Why not give the drug intravenously — instead of intramuscularly?" So he gave metrazol intravenously. And that was it! One swift injection and, *bang!* every time a fit, and one that shook your man to his foundations.

That Sakel had never been able to do. He had never given the fit-producing drugs intravenously and it was just that that made all the difference in getting a fit exactly when you wanted it.

More. Sakel had never used metrazol *alone*, never even conceived of the fit as being the sole therapeutic agent. Meduna, with his conception of either-or diseases, did. Was he right or wrong? Let's see.

Soon he had given epileptic seizures, by this new technique, to fifty, seventy-five, a hundred and ten schizophrenics. And he was getting not only improvements but *cures*. No doubt about it now, he thought, there *was* a constitutional antagonism between the two diseases, for these epileptic convulsions undoubtedly drove out schizophrenia.

One hundred and ten cases — and fifty-four remissions. That was good enough for anybody. That, for a new, experimental therapy, was brilliant. That encouraged a man to go on.

Meduna felt one foot touch solid earth again. (And all the time, if he had only known it, there was no bridge there at all, no tightrope even. He had crossed the abyss on thin air!)

In 1937 came an event of the first importance in the life of Ladislaus von Meduna — an international medical conference at Münsingen, Switzerland, called for the purpose of discussing

Sakel's new shock treatment. Sakel had, in a series of articles published in Vienna in 1933, described in minutest medical detail the entire procedure of the shock therapy, with charts, reports, case histories, so that what was put into the doctor's hands was a practical handbook for giving the treatment. And it knocked the psychiatrists out of their swivel chairs.

For never before, in the whole history of medicine, had there been a cure, not an effectual treatment even, for schizophrenia. The clear, step-by-step account of the exact procedure to be followed, outlined in Sakel's book, was the first statement and description of a definite, physiological method of attack on schizophrenia ever formulated.

You may remember something of the bitter wars fought over practically every important medical discovery — the struggles of Pasteur, Koch, Lister, Semmelweis, Ehrlich, Morton, to put over their ideas. The medical profession is constitutionally and ineradicably conservative — as it should be. We have no desire to be guinea pigs. But at times it does seem as though it were a little overdoing its classical role.

So when Sakel's book was translated and read in many tongues, the pooh-poohs were quite as loud as the hear-hears. And even the hear-hears expressed no conviction that the treatment would not kill before it cured. These were lethal doses of insulin the Austrian was prescribing. They called this conference in Münsingen to try to resolve these doubts and disputes. It was to be devoted entirely to the shock treatment with insulin.

And in the midst of it someone got up and read a paper on shock treatment with metrazol alone.

What's this? What's this? Never in the history of medicine has there been a cure for schizophrenia — and now, all of a sudden, there are two? Metrazol, epileptic fits, biological antagonism between two diseases, convulsions drive out insanity — what is all this? Meduna? Who's Meduna?

Meduna rises. Yes, he has a variation of the shock treatment to suggest — convulsions alone. Yes, he has treated one hun-

dred and ten cases — with good results, yes. Other men, too, have tried it. Gentlemen, there is no idea in anyone's mind of supplanting the shock with insulin. The metrazol convulsive shock is merely an alternative method. Sometimes one is indicated, sometimes the other.

Another man rises, Dr. Georgi. They have discovered, he says, that crossing the two treatments often produces the best results of all. There are several ways — for example, giving the two drugs on alternate days or one after the effects of the other are terminated.

Everyone is very polite, the insulin men listen attentively, the metrazol men are almost apologetic, but beneath the surface can be sensed an undercurrent of antagonism. It begins to look as though two opposition camps might be set up.

The Münsingen symposium breaks up. There has been a little talk of this chap Meduna, and his either-or diseases (nine papers in all on the metrazol convulsive therapy have managed to get themselves read), but the big excitement is, of course, Sakel, and his insulin shock. This, if it is true (and it looks very much as though it might be), is one of the most important contributions ever made to psychiatry. The catch is, of course — well, as old Koch said, how can you cure diphtheria when you don't know what diphtheria is? And we don't know what schizophrenia is, do we?

Back they go, each man to his own country, the conventional lead which every psychiatrist had always worn in his shoes replaced by springy, elastic rubber heels, and set to work convincing boards of directors and state legislatures that they'd save themselves money in the end if they would vote a sufficiently large appropriation for this new shock treatment.

Overnight asylums became hospitals. Instead of armed guards patrolling the grounds, doctors and nurses whisked around corners and bent over cots. The smell of paraldehyde vanished from the wards. Bars disappeared from windows. Strait-jacket manufacturers went out of business. And out of the doors of these hospitals (which now swing both ways) began to emerge

those cured incurables whom insulin was returning to a world of reality.

And what of metrazol? At Münsingen Meduna had had one hundred and ten cases to report. There had been friendly and interested ears as well as hostile ones. Some men saw in this either-or theory of his a real idea. And they, too, went home and tried. So by 1938 Meduna had, from all sources, three thousand case reports on the metrazol convulsive treatment. He came to America and presented the results, which were that in *acute* cases of schizophrenia of less than one and a half years' duration they got 52 per cent total remissions, and with cases of less than six months' duration, 60 per cent total remissions. (There was one other figure, not thought so important at the time, which we will save until later. Perhaps it was the most significant figure of all.)

All this looked good. So good, in fact, that doctors began saying, Well, how about it? Mightn't it be a sound idea to try metrazol instead of insulin? For look: You could treat hundreds of patients with metrazol while you were treating a dozen with insulin. A few minutes for each patient instead of five hours — and maybe only twenty treatments instead of sixty or so. Fewer doctors, fewer nurses, fewer beds. And it didn't take a staff of specially trained experts to give it either; practically any doctor could do it. A quick injection, a couple of attendants to restrain the patient for the few minutes the convulsions lasted, and on to the next bed. Easy, quick, cheap.

A lot of doctors waxed enthusiastic. Here was something even a state hospital could afford. So when they couldn't wheedle large enough appropriations for the insulin shock treatment, or find men trained to give it, or because they were honestly convinced of its superiority, a number of hospitals undertook the metrazol shock treatment.

And the war was on. Insulin versus metrazol. Doctor versus doctor. Hospital versus hospital.

Now perhaps it would seem to you that a medical question such as this could be quietly and reasonably settled on its merits. All that is needed is a sufficient number of cases treated by each

method, results tabulated, reports made, a decision reached, all in a spirit of scientific objectivity.

But it seldom happens that way. Did it happen that way with Mesmer — or Braid — or Freud? Medical disputes are about as objective as a lynching. Doctors are about as impartial as the *aficionados* of a bullfight. . . . So it was war.

This was the issue. Meduna claimed he'd discovered a new treatment, separate and different from Sakel's, and superior to it because more practical. Sakel insisted the convulsion was merely one phase of his original shock treatment, that he had used metrazol and other convulsant drugs to provoke a fit during insulin shock from the first and had fully described this combined coma-convulsion treatment in 1933 and 1934, before Meduna had announced his "discovery." Meduna, contended Sakel, had merely isolated one phase of his (Sakel's) treatment, which most emphatically was *not* an insulin treatment, but a physiological shock treatment — and by shock Sakel meant, and always had meant, *any* means of producing a physiological shock that came to hand, and, naturally, convulsions as well as coma. Meduna, in Sakel's opinion, had elevated this one phase, the convulsion, into a separate treatment — which it should never be, for, split off from the rest of the treatment, it was, according to the Austrian, not merely greatly diminished in value but, indiscriminately used, actually harmful.

The controversy still rages. Both sides still have their adherents. But on the whole — well, let us quote from the latest report of Dr. Ross and Dr. Malzberg, covering the nineteen New York State Hospitals where one or both of these treatments were given.

But first a word on the nature of the two drugs.

Insulin is a body product, a secretion of the pancreas. Originally even Sakel thought it might be dangerous in large doses but today, tamed and controlled by the knowing use of glucose and various drugs, it is no more dangerous than an old, toothless lion.

Metrazol is a synthetic drug, produced nowhere in the body. Unlike insulin, it cannot be controlled. It produces, not coma

or a fit, but always a fit, and a very violent fit which cannot be terminated by glucose or any other known agent. It must take its course.

Now the report: —

Thus far 1757 patients suffering from dementia praecox have been treated with insulin hypoglycemia in the New York State Department of Mental Hygiene and 1140 patients have been treated with metrazol.

Metrazol is much easier to administer and requires little skill. So if the results obtained with metrazol compared favorably with those obtained with insulin there would be no question as to which drug would be more desirable.

But —

It will be observed that *the recovery rate for the hypoglycemic (insulin) treatment exceeded that of the metrazol group by a ratio of 6.9 to 1; the rate of much improved by 2.7 to 1.* Of the insulin group 63% showed some degree of improvement while in the metrazol group only 36% were improved.

*Clearly the results following insulin treatment far exceeded those obtained with metrazol. Furthermore, it will be observed that the recovery rate following treatment with metrazol was less than half that obtained with the control group (untreated patients) and the rate of much improved was also higher in the control group.*

The shift to metrazol by some hospitals can only be explained by the fact that metrazol is so much easier to administer.

It is well known that there have been many accidents such as dislocations and fractures as complications of the treatment with metrazol. We are led to believe that metrazol alone is not only not a particularly effective but that it is also a very dangerous drug. In selected cases, in combination with insulin, it has proved itself of value and in our opinion should be used only in such combinations. The New York Psychiatric Institute has reported fractures of the spine in 43% of the patients treated with metrazol.

It would seem therefore, that in selecting a treatment for dementia praecox there should be no question as to the superiority of the hypoglycemic (insulin) over the convulsive (metrazol) therapy. The value of the insulin treatment is now definitely established.

No pussyfooting about this report. Does it dispose of the metrazol-convulsive shock? Perhaps . . . perhaps not. Let us continue.

In 1928, a young American, an explorer for the Goodrich Rubber Company, riding through a thicket of orchids in the Ecuadorian jungle, was thrown from his horse. That night he felt as though a belt around his middle were crushing him. Still he thought it would pass in a few days. Most pains had to down there, two days from the nearest doctor.

A few days later he dropped a cup of coffee, soon after began fumbling with things, then found his hands shaking. Three months later he was a rolling head on a pillow in a hospital in Washington, D. C., the rest of him being dead in the living death of spastic paralysis.

The Eminent Specialist who paid him polite but futile visits kept muttering something about "curare." If only he had some curare . . . and if only he knew a little more about it. . . .

The young "functional explorer," who wanted to go on living as a paralytic even less than he wanted to die, lent an ear to these vague mutterings. Curare, eh? He knew something of curare — had talked of it with the Indians of the Amazon Valley, who made it. It was the mysterious poison they brewed when they intended to take no chances on the kill. A drop of it on their arrows and it was dead jaguar or dead man in a matter of seconds. And now this Eminent Specialist thought that perhaps, if he had enough of it of the right quality — and knew more about it — he might cure this spastic paralysis, eh?

Very interesting. Very interesting, indeed. But just a dream. Because the Eminent Specialist didn't have any curare and couldn't get any.

So Richard Gill, our ethnobotanist, had (since his mind was made up on that point) to get well without the help of curare. It took him four years, but he did it — training his muscles tediously to move again by tying knot after knot, buttoning button after button, transferring marble after marble from one cereal bowl to another. And then the legs. And while he was doing this, he discovered a new vocation.

He would return to the Amazon jungle, where live those clever tribes who brew curare, and he would become, so help him, a fullfledged witch doctor, even though it meant risking his favorite neck. He would trade white magic for black magic till at last he possessed the secret of curare. And the Eminent Specialists would, in future, have their curare.

After a few years he returned to Ecuador at the head of his own functional exploring expedition, penetrating deeper and deeper into the jungle until finally he met Yasacama, curare brewer, established himself, by the white magic of flashlights, peppermint Life Savers, and cookstoves, as a great white witch doctor, and one day was held worthy to be taught the pre-Inca magic of curare cooking.

In 1939 he emerged from the jungle with a supply of curare to satisfy any number of Eminent Specialists, the raw ingredients for more, and the formula for making it. Wherefore it is now being made in these United States quite commercially and unmagically, this secret and sacred Indian drug, and being used to help cure our 200,000 victims of spastic paralysis.

And what has all this to do with insanity?

No sooner did Gill cross the border bearing a commercial supply of his precious drug than science began to invent new uses for it, uses the Incas had never dreamed of. The neurologists were among the first to discover its peculiar value for some of the ills they treated.

As you have heard, one of the objections to the metrazol shock is the violent, bone-breaking nature of its convulsions. Now the nature of curare, and the way it kills, is that it paralyzes. Metrazol contracts the muscles, curare paralyzes them. . . . Well?

Well, there you are! said Dr. A. E. Bennett, psychiatrist. That's all there is to it. You inject an infinitesimal dose of curare into your schizophrenic patient, then a shot of metrazol, the two nicely balanced to achieve the exact degree of convulsion you want, and — you get a nice quiet fit.

In the laboratory, working with guinea pigs, these notions often work out very well — so well that you have no doubt

they're going to be a wow when you use them on humans. But . . . well, in this case, there were a lot of problems involved — to find a dose of this deadly poison not lethal to human beings yet paralyzing, its effect lasting so long and no longer, and, most important, depriving the fit of its violence without depriving it of its effectiveness. Possible?

In 1940 Bennett injects his first schizophrenic patient with what he judges to be the correct dose of curare. He stands by and watches, he and his assistants. They see the eyelids flutter, droop, the neck muscles become limp so that the head falls back and must be supported. Next all expression is wiped from the face. Their man tries to speak, his words are heavy-footed, trail off, cease. His jaw drops. Now the bigger muscles begin to succumb. The spinal muscles become as water, the arms and legs grow flaccid — it's over, he's completely paralyzed. He couldn't, not if a bomb were dropped on his bed, move a finger to save himself. Now is the moment!

Reaching for the syringe, Bennett injects the metrazol and, on the instant, as is the way with metrazol, the fit is brought on — but this time tamed and limp. As he had planned, the curare has acted as a shock absorber, cushioning the convulsions, which come out as flat and lifeless as a dishrag. With such a fit, no bones could be broken — no bones, when curare has been used, have ever been broken.

And the beneficial effects of the convulsions have not been lost. So today metrazol is being used, in combination with curare, in many of the leading psychiatric institutions, with no danger of broken bones. . . . Thank you, Mr. Gill.

And as if that were not enough, they discovered something else. In their laboratories chemists never cease to combine, invent, discover. One day beta-erythroidin-hydrochloride emerges. Try that in combination with metrazol, gentlemen. It should make those fits less violent. So three doctors try it. No bones broken, and the effectiveness of the metrazol convulsion not appreciably lessened.

So the danger of broken bones is eliminated. But there are other objections to metrazol. There is, for instance, fear.

Of the insulin injection there is no fear. Insulin invades the system slowly, like a hypnotic. But one has only to see a once-metrazol-shocked patient to realize his fear. The metrazol seizure carries an aura of terror that glazes the eyes, wrings screams from the constricted throat, flings the body about to escape the needle. Often preferring their insanity to the fit, patients offer such resistance that treatment must be discontinued.

This drawback, too, must be overcome.

They search the pharmacopoeia. There is this and there is that — finally they hit upon scopolamine hydrobromide. It soothes — relaxes — brings drowsiness. That should do the trick.

They try it. One hour before metrazol — scopolamine. When the metrazol comes the patient is withdrawn, quiescent; and after the convulsions he remains drowsy, unperturbed by the crisis. . . . One more step forward in the metrazol convulsive treatment.

And as for that bridge Meduna crossed on, it simply didn't exist. It has been proved — and he himself now admits — that there is no biological antagonism between epilepsy and schizophrenia. They are not either-or diseases. When the metrazol convulsions bring about a remission, it is for some other reason than that the two diseases are constitutionally opposed — what reason, they do not yet know. Metrazol and insulin act differently, use different mechanisms, but in neither therapy is the *how* of this process yet understood.

It was for schizophrenia that Meduna proposed his metrazol convulsions and it was for schizophrenia that they were chiefly used. On the value of this treatment for this illness medical opinion was much more divided than on the shock with insulin, figures varying all the way from those of Ross and Malzberg (who reported fewer recoveries with metrazol than with no treatment at all) to some statistics which were far more favorable.

But this is only half the story. We have said that an accident as well as a mistake played a role in Meduna's story. The mistake was his either-or theory. Now for the accident.

In giving the figures on remissions which Meduna brought to this country, we deliberately omitted one. Here it is: remissions in the affective psychoses — 77 per cent. An extraordinary per cent, yet one to which no one seems to have paid a great deal of attention, not even Meduna. He had set out with a definite goal — to discover a cure for schizophrenia. Perhaps also his original mistake prevented his seeing the true significance of this finding. Epilepsy was biologically opposed to schizophrenia, *not* to the affective psychoses. It took several years, an entirely new approach, a whole new group of men (in Rome this time), and a few of our own scientists, to prove to the psychiatrists what a valuable weapon they possessed in the induced convulsion. They went all around Robin Hood's barn before they found that out.

To begin in Rome.

"Shock," some of these men began thinking. "Shock, eh? Well, there's more than one kind of shock. For example . . ."

### XIII

## *Shocked into Their Senses*

FOR twenty years she had been an inmate of a private asylum — in the days when “inmate” and “asylum” were exactly the right words. She lived in a little private world of delusions and hallucinations and fears into which reality never penetrated. There was no familiar face or object of which she was not afraid — the doctors, the nurses, the food, the grounds.

She had to be forcibly bathed, so great was her fear of water. One day, struggling in the bath, she fell and struck her head. She was treated for a severe head injury and, returning to consciousness, she sat up in bed, looked about her, and said, “What am I doing here? Where is my husband? I want to go home.”

She was completely lucid and she remained so for the six weeks they kept her under observation. Then she went home. That was many years ago and at last reports she was still at home, still well.

A psychopathic criminal in an asylum in Austria tore and twisted his blanket into a noose, strung himself up, and was almost dead when a guard discovered him and cut him down. When he was resuscitated, his mind was found to be clear as a bell — no auditory or visual hallucinations, no homicidal or suicidal impulses. He remained sane for several months.

A patient escaped from an asylum in Germany, was pursued, climbed a pole carrying a power line, touched the wire, fell,

and, when captured, was found, as a result of the electric shock, to be in his right mind. The remission lasted six weeks.

Concussion of the brain. . . . Suffocation. . . . Electric shock. . . . *Shock*.

It was known to the ancients. It was practised in medieval days. It was prescribed in the nineteenth century. A lunatic was dropped through a trapdoor, plunged into an icy bath, given a slight electric shock. Even earlier the insane were sometimes whirled in a rotating chair, chained in a well of rising water, lowered into a snake pit.

It sometimes worked. But not often. And sometimes it worked the other way round. People were shocked *out* of their senses. There were even cases on record of individuals who had gone crazy following an emotional shock. Occasionally one of them would recover on receiving a second shock. It was all very haphazard and unpredictable.

But after the discovery of the shock treatment with insulin, doctors began wondering about these other forms of shock. Might there not be some scientific basis for their effect? If so, instead of waiting around for a patient to grab a live wire or hang himself, might it not be possible — ?

All right then, what about concussion of the brain? Well, it really did seem as though that would have to be an act of God. A doctor can't very well knock a patient over the head or fling him downstairs. Very well. But how about electric shock?

A few years ago I visited a mental hospital to see a then new treatment.

I was admitted to a long corridor. Some twenty men, in bathrobes and pajamas, lounged about on the benches — patients awaiting treatment. There were nurses and attendants somewhere about of course; there were none in sight at the moment. These patients, psychotics all, were unrestrained and without guards.

I remembered that there was once a very timid little man, so timid that when Napoleon appointed him as his physician he

refused the post for fear he would never be able to stand up to the great man (who was even smaller than he was) and tell him what he must and must not do.

One day this timid little man entered the largest madhouse in Paris, the Asylum of Bicêtre, of which he was the Director, clutching a government order he had fought long and bitterly to obtain.

Maniacs thronged about him — threatened, spat, kicked, rolled, laughed, shrieked. But since they were all, even the oldest and frailest of them, handcuffed, chained to walls, or locked in dungeons, they could do no harm. Still they *wanted* to do murder — that was certain.

The timid little man turned to the locksmith he had brought with him.

"Strike off their chains," he ordered.

"But, monsieur, they will kill you!"

"I'll take my chance."

"But they'll kill *me*!"

"*You'll* take that chance."

"But, monsieur — "

"Strike off their chains, or I'll find another who will."

The maniacs were released.

One man stepped out of a dungeon where he had been confined for half a lifetime and, looking about him in the sunlight, said, "I had forgotten the world was so beautiful."

Pinel, the timid little man, stood quietly among these madmen, smiling, and it is said that many kissed his hands, many wept, and none offered him violence.

"But how will you restrain these madmen once you free them?" the government officials had demanded.

"By the bland arts of conciliation or the tone of irresistible authority pronouncing an irrevocable mandate," replied the little man, drawing himself up. And you knew that he could, too.

It was restraint, he held, which made these people violent. And this has proved to be the case. As a rule the insane are not restrained today, mechanically or chemically, and yet one

is far safer among them than in many seemingly sane quarters of the globe.

I walked to the end of the corridor, entered a large hall, and saw Dr. Deutsch, in his long white coat, standing at the head of a treatment table, surrounded by doctors, nurses, attendants. Behind him on a small table was a metal box, about twelve by ten inches.

A patient walks briskly in, pulls off his robe, kicks off his slippers, lies down, and pulls the sheet up to his chin.

"Go ahead, doc." Obviously he's used to this.

"How do you feel today, Bevans?" asks one of the doctors, Dr. Konrad.

"So far it doesn't seem to have done much good, doc. I think I'm better than I was at the height of the trouble two years ago, but I don't notice any improvement since these treatments started."

(The sanity, at times, of the insane!)

Three small sandbags have been slipped under Bevans' shoulders and Dr. Deutsch has smeared a thick yellowish jelly on his temples. Now he is dipping the padded ends of forceps into a big bowl of salt and water and the white folds of gauze over the rubber pads are soaking it up. The dripping forceps are clamped over Bevans' head, a pad on each temple. A gag is slipped between his teeth, the five attendants bear down on ankles, knees, hands, and shoulders. Dr. Deutsch reaches out to the box.

"Ready?"

"Ready."

He throws the switch.

It happens — what *would* happen when you throw 110 volts of electricity into a living body. It seems as though it would burst. For fifty seconds it seems as though it would burst. Dr. Deutsch's hands, restraining the head, vibrate violently. The eyes roll up, the face pours sweat, throat and chest are inflamed. . . . But when he is rolled out of the room in just sixty seconds flat, the man is blue. One knows now, if never before, that a face *can* be blue, blue as a gas flame.

Another man walks in — and another — one every few minutes. It goes on all morning.

This is the electric convulsive shock.

In 1937, in a clinic in Rome, Dr. Cerletti, whose specialty is epilepsy, one day said to a few colleagues (a chap named Bini was among them), "Epileptic convulsions, produced by metrazol, are very helpful in the treatment of schizophrenia. But they are dangerous and greatly feared by the patients. Now an electric shock will produce convulsions, and, unlike metrazol, electricity can be controlled. So if we could get a machine . . ."

Bini thought that over. A shock, not lethal, which would give a good strong convulsion. . . . A shock which would knock out the brain but not affect the heart. . . . A shock which would break no bones and arouse no fear. Quite an order. But the more he thought about it, the more he thought he could do it.

So he set to work making big boxes and little boxes with all sorts of curious electrical insides. Until at last he had one about the size of an overnight bag. And this one seemed to do everything he wanted it to do and nothing he didn't. You had only to turn on the current one tenth of a second, and you got exactly the kind of fit you wanted — in dogs.

By this time Dr. Cerletti and a number of his assistants in the Rome clinic were in on it. They took to spending their days and nights in trying it on the dog. Dog after dog. They worked up finally to giving one dog fifty-four fits in four hours — and *still* he came up wagging his tail. So it looked as though it were perfectly safe.

Danton had a motto: "*De l'audace, encore de l'audace, et toujours de l'audace.*" Doctors have turned it upside down and taken it for their own. "Caution, more caution, and always caution."

They proceeded from dogs to humans by way of something scarcely human — a creature long insane, beyond metrazol, beyond insulin, even beyond a miracle. They needed to perfect their technique before going on to the final step — treatment

to cure. What better purpose could such a poor wretch serve?

They worked out a perfect technique, using these chronic cases to experiment on. And at last they were ready for the final test.

They chose a group of acute schizophrenics, cases not above six months in duration, gave them one shock a day, every other day. Very soon some of them, no doubt of it, began to clear up — some after the tenth treatment, some after the fifth, some even after the first. Soon some of them were well — *cured*.

In 1939, Dr. Kalinowsky became the ambassador of the Rome clinic to foreign countries. He traveled to Holland, France, Switzerland, England, finally to America, introducing this new form of shock. It has, as we shall see, certain obvious advantages over the metrazol shock. For one thing, this electrical convulsion, although a fullfledged epileptic seizure, arouses no fear. Why?

Out on a bench in the corridor, a young man, wheeled out of the treatment room not ten minutes ago, is reading a book. This in itself is unusual since most psychotics don't read so much as a newspaper. He holds it out to us. It is Tarkington's *Penrod*.

"What are you doing here, Schaeffer?" asks Dr. Konrad.

He looks vaguely about.

"Waiting for the treatment, I guess."

"You haven't had your treatment yet?"

"Nope."

"Have you had your breakfast?"

"Nope." (He has, for there is no need of starvation before the electric shock.)

"Have we had Thanksgiving yet?"

"Nope." (We have — two days ago.)

"When was your last treatment?"

"I don't exactly remember. Let me see. Did I have a treatment this week? I remember going into that room — anyway it was a long time ago."

"Was I there?"

"I don't remember you."

"How did it feel?"

"I didn't feel it. It was nothing."

"You see?" says Dr. Konrad, as we pass on. "There is complete amnesia, not only for the shock itself, but for a considerable time before it—even sometimes for several days. Since they have no memory of the shock, they have no fear of it. . . . How are you feeling today, Arnold?" This to a boy lying on a bench, smoking. The doctor lifts one of his arms, pushing back the sleeve. "No more scars?"

"No, sir."

"He used to bite his arm or burn it with cigarettes. The first day he came here he grabbed an electric-light bulb and cut his throat. Why did you do those things, Arnold?"

"I wanted to feel—*alive*."

"What are you doing here now?"

"Waiting for treatment."

"You can go. You've had it."

"*I have?*" He looks stunned.

A young man comes up to us.

"This electrocution is doing me good, Doc. When I first came here I had a lot of crazy ideas. I thought this was a prison and you fellows were jailers, and no matter what you said, I knew you were going to kill me. Well, I deserved it. I wasn't living right. I wasn't right with my mother. But this electrocution squares me."

"Quite a lot of them have that idea," says Dr. Konrad, moving on.

"This electric convulsive shock," the doctors here are careful to explain, "is not offered as a *new* treatment. It is merely an improved method of producing epileptic convulsions, which are still the basis of the treatment. If all that is necessary to bring about a remission is a reduction of the energy of the brain, then this type of epileptic seizure, which does just that, is clearly superior to metrazol. We have used it for schizophrenia and for the affective psychoses and a remarkable thing has developed."

This remarkable thing?

You remember Dr. A. E. Bennett, who first used Gill's curare to produce a limp convulsion? Well, in 1937 Bennett began saying to everyone, "I wish you'd just take a look at these figures on remissions with metrazol convulsions in the affective psychoses. *How do they compare with the figures on schizophrenia?* Why, man alive, there is no comparison! Seventy-five per cent, 80 per cent, 85 per cent — where do you get such figures?" A little later the men working with the electric shock were saying to one another, "I say, take a look at these figures on remissions in the affective psychoses!" And soon they were all saying it to each other, the men using metrazol and the men using electricity: "I wish you'd just take a look at these figures. . . ." The most cautious, the most conservative of men burst into superlatives.

Dr. Bennett: "This has proved to be one of the most remarkable specific therapies of modern psychiatry. Ninety per cent of severe resistant depressions clear up within three or four weeks after six or eight convulsive shocks, either by metrazol or by electric shock convulsions."

Dr. Kalinowsky: "The results are spectacular. Everyone who has seen depressive patients mute, stuporous, and tube-fed for years, who after three or four convulsive treatments recover completely, will no more belittle the importance of these treatments. In this group amazing recoveries are achieved in the majority of cases."

He puts the figure at 80 per cent. Cheney, of the New York Hospital, puts it at 80 per cent. So does Sogliani in Italy. With metrazol or with electricity, the convulsive therapy gives 80 per cent remissions. It's almost mathematical.

Let me lay before you the report on one such case.

*September first.*

I saw her for the first time through the glass doors of the ward. She was alone and she paced ceaselessly back and forth in a limited space as though she followed an invisible line on the floor, never lifting her head, moaning and wringing her hands. She was about fifty years old, little and sallow and shrunken.

When Dr. Konrad spoke to her she neither looked up nor stopped whining. He led her to a window.

"What is the trouble, Mrs. Ehrich? Tell me, I want to help you." No answer. The whine merely changed to an animal-like bleat. "Have you a son, Mrs. Ehrich? Where is he?" (She *has* a son; he is in a mental hospital.) "Do you want to see him? Is there something you want to tell me? What can I do for you?" No answer, just the low tearless bleating.

I see her record. She isn't always mute. Occasionally she cries out, "Torturers! . . . Kill me — don't torture me! . . . What have you done with my son? . . . Take the food away — it is poisoned! . . . When do they start taking pictures of me? . . . Stop this torture!"

The report concludes: "Involuntional melancholia with paranoid features. Ill one year."

*September 3.*

They have decided to start electric convulsive treatments. We enter the treatment room. Mrs. Ehrich is on the table. She is completely withdrawn — sees no one, makes no sound, lies motionless. It is useless to question her.

A light shock — the *petit mal* of epilepsy. That is all that is given at the first treatment.

Half an hour later we see her in a private room. She is exactly as on the first day I saw her — completely unresponsive, except that at the end she whines, "I wouldn't believe anything you say."

*September 10.*

Mrs. Ehrich is about to have her fourth electric shock treatment. She is sitting on the treatment table.

"Who am I, Mrs. Ehrich?" Dr. Konrad asks her.

She looks up at him.

"Someone I knew in Brooklyn, I think."

"How do you feel?"

She glances at me.

"Is this an interview?" — a shade of irony.

"What did you think when you first came here?"

"I thought everyone was trying to deceive me. The nurses

were paid to play a part, the rooms were planned to remind me of the past, they brought me clothes that didn't belong to me."

"Why wouldn't you eat?"

"How could I eat, knowing my son was sick? A mother . . . "

She begins to bleat.

They give treatment.

*September 20.*

Mrs. Ehrich has had seven treatments. This is the day after the seventh.

Dr. Konrad stands in the doorway of a large, thronged room and calls, "Mrs. Ehrich!"

Before we see her we hear her call, "Oh, Dr. Konrad, good morning!" She hurries toward us, patting her hair, smiling. She puts an arm about me.

"Of course, I remember you. How nice of you to come. My hair looks so badly — they're so busy here, I haven't been able to get it done."

In a private room we talk for half an hour. She is responsive and cheerful, even when speaking of her son. Perhaps he will be given these same treatments, she says. Perhaps they will help him. She would like so much to see him.

Her memory is not good. She has forgotten many things — how long she has been ill (whether it is weeks or years), that she had previously had delusions about the nurses and the food, that relatives have been to see her. She often appears perplexed.

"I was very weak," is her explanation of her condition. She has no insight into her illness.

*October 6.*

Mrs. Ehrich has had eleven treatments.

We go to her room. A well-groomed woman greets us — hair waved, lipstick, rouge, a smart dress, even a handsome jewel. She looks ten years younger.

"This is very nice of you. Sit down, won't you? — Thank you." She takes the proffered cigarette. "I can't thank you enough for what you've done for me, Dr. Konrad. It's so good

to be well and happy again. I'm almost entirely well now — just an occasional lapse of memory, but I remember better every day."

(The loss of memory may, of course, be due to the shock itself, and may soon pass.)

She is very cheerful, talks freely, smiles often, laughs occasionally. A strong, assertive personality is emerging. This woman must have gone down fighting.

"I was very ill," she continues. "I had such strange ideas — that everyone here was deceiving me and trying to torture me. I thought everything I saw had been arranged for the sole purpose of fooling me — even the view outside the windows." She laughs. "One day I led my husband over to the window.

"'You're not going to try to tell me that that is the Hudson River?' I asked him.

"'Of course it is the Hudson River,' he said. I didn't believe him. I was convinced it had been put there to fool me.

"I went home over last week end. I went to several parties with my friends. Everyone was so kind and I was really happy. I expect to go home for good in another week."

"She really appears quite normal," says Dr. Konrad as we leave. "A slight tremor of the hands, those occasional gaps in memory — that's about all. I think she'll be all right. Once we get them well, we can usually keep them well."

I saw this transformation take place within the space of one month — this transformation from a creature little more than a tortured animal to a woman eager and seemingly able to lead a normal and happy life. That is no small thing.

Here then is the real triumph of Meduna. Via Vienna, Budapest, Rome, and the United States, the circle was completed. Whatever the ultimate judgment on his method (or its electrical counterpart) for schizophrenia, we must grant that he helped to develop a procedure quick, easy, cheap, that brings "amazing" results in the affective psychoses. And the gain in individual happiness is not less, but more, when a human being is returned to normal life from these dread illnesses than from schizophrenia. Though there is a tendency to spontaneous re-

covery in the manic-depressive psychoses, still they represent the ruin of many lives and result in a multitude of suicides.

The fact that the electroshock is superseding metrazol and that many hospitals have dropped the drug entirely in favor of electricity does not affect the value of Meduna's contribution. He showed the way by pioneering the pure convulsive treatment. Bennett himself, who may claim to have discovered the value of the convulsion for chronic depressive and manic states, has, for five years now, discarded metrazol and completely substituted the electroshock, which likewise, due to the possibility of fractures, he cushions with curare. He says he gets even better results than he did with metrazol.

Let one of our foremost skeptics, Dr. Abraham Myerson of Boston, have the last word.

"The saddest event in the history of psychotherapy," he says, "is the victory of that therapeutic Blitzkrieg called shock therapy in the treatment of the affective psychoses. Here are conditions which seem entirely psychic — emotion, mood, desire, affectivity are involved with no known physiology, no known organic basis. The setting seemed ideal to generations of psychiatrists for psychotherapeutic means of cure — with complete failure as the result. Nothing in the history of psychiatry is as dismal as its record in manic-depressive psychosis, a disease which seemed made to order for psychotherapy.

"Then came the metrazol shock therapy, introduced on a thoroughly false premise for the treatment of schizophrenia, utterly without logical or physiological foundation, as yet, for the treatment of anything under the sun — and it is of great help in the affective psychoses!

"Cases resisting all forms of psychotherapy, including psychoanalysis, and adamant to all the gentler drugs, disappear like mist after half a dozen brutal convulsive seizures. We have complete remissions of multiform obsessive fears of the most disabling type after four treatments. It is only from the organic damage of metrazol or some unknown therapeutic component that these good results follow.

"And even in schizophrenia, physiological means of whatever

type have been more important than any amount of psychotherapies. In mental disorders and neuroses, more is accomplished by a few drugs, shocks, and such measures, however crude, than by all the refinements of psychotherapeutics."

But even concerning the affective psychoses, certain dyed-in-the-wool pessimists will say, "All very good. Certainly you can cure a manic-depressive patient with the insulin, metrazol, or electric convulsive shock, but remember this: the attack in this disease always ends sometime anyway—in a few weeks, or months, or years. So you're not really curing anything; you're merely shortening the attack. There will be another, and you'll have it all to do over again."

Perhaps. Perhaps not. The majority of these patients have only one or two attacks in a lifetime. If it can be shortened from months or years to weeks, that's not to be sniffed at. If, as some psychiatrists claim, these individuals are generally a bit queer in between times—well, aren't we all?

There is, however, another danger—loss of memory, which is fairly typical of the electroshock. And not only an amnesia covering part of the past, but also sometimes the inability to hold recently acquired facts the normal length of time. Will these memory defects pass? Or have the convulsions produced permanent brain injury? Will the brain in time compensate for this? If not, is the clearing up of a depression worth the price of a lasting memory defect?

The answers are coming in. Dr. Foster Kennedy, prefacing his statement by the remark that he was afraid of small voltages and unafraid of large ones, recently said that not only had he had no deaths in many thousand treatments, but no intellectual impairment, and that many of his patients were successfully carrying on severely intellectual work.

Many others testify that memory defects are only temporary, that intelligence and personality are not adversely affected. As for broken bones, Kalinowsky reported that with 1500 patients he had had only two fractures of the long bones of the body and no fatalities. Not all reports are so favorable. Dr. A. E. Bennett, summing up the evidence, says: "A number of

unexplained deaths have occurred. Many fractures have been reported. A large number of treatments (up to fifty) produce profound organic sensorium defects equivalent to an *amentia* greater than that seen in lobotomized patients. There is no conclusive evidence of permanent brain damage." He concludes that, in spite of drawbacks, the electroshock, when cushioned by curare, is certainly justified in suitable cases.

In involuntional melancholia, the gain is greater than in the manic-depressive psychoses, for, once cured, there is little danger of a recurrence. Mrs. Ehrich should go on being a well and happy woman the rest of her life.

So far we have considered only the great achievements in the field of treatment, the magnificent discoveries which, into the most distant future, will mark our age as one of the most brilliant in the history of psychiatry. Of the rest of the treatments of which we are to hear in this chapter it cannot be said, "These are great discoveries." We don't know yet. They're only in the making. But it's always fascinating to sit in on the mental processes of a man who is, or may be, making an epochal discovery.

The immense activity which started back in 1927 constantly gathers momentum. Everywhere new things are attempted. In laboratories, in research institutes, in hospitals, men are inventing new methods of attack on mental disorders. Behind closed doors momentous things are going on. . . . Perhaps we can open some of these doors a crack.

A patient in an asylum in Austria twisted a blanket into a noose . . . strung himself up . . . when cut down was found to have a mind as clear as a bell. Remember?

Well, how about suffocation? What could happen when the body is deprived of oxygen, as in hanging, to clear up a severe mental disorder?

This: The brain, suddenly deprived of oxygen, would feel this deprivation more quickly than do any of the other organs of the body because the needs of the brain in this respect are very high compared with other organs. Well, what happens to the brain when its oxygen supply is cut off?

You have only to think of mountain climbers and aviators to get the answer to that. In the rarefied air of the higher altitudes they sometimes go crazy — that's what happens. Take the case of Pilot Adams, reported by the United States Army Medical Corps.

They're testing Adams for the effect of high altitudes on his mental processes. Before they take him up they test him at sea level. They give him a few problems in arithmetic.

"Multiplication — sure," says Adams. "I'm no shark but these look easy. Let's see —  $5792 \times 4833$  —"

In short order he has the answer to one problem and goes on to the next. He gets all the answers right and in an average of sixty-five seconds flat.

Now up in the air with you, Pilot Adams. They ascend, he and his examiner, five thousand, ten thousand, nineteen thousand feet, the examiner breathing oxygen from a tank and Adams taking the air as it comes.

"How do you feel, boy?" says the doctor.

"Fine. How should I feel? Do you take me for a sissy?"

Upon which the examiner knows that the altitude is beginning to tell on him, for on the ground no more courteous man breathes than Pilot Adams.

"Think you could do a few sums?"

"Sure — why not? Hand 'em over. Well, why in thunder don't you hand 'em over?"

The examiner gives him the same problems he has just done down below. Adams doesn't recognize them. Scowling, mumbling, counting on his fingers, he finally produces one answer. It has taken him five and one-half minutes and he has every figure wrong. His mental processes are five times as slow and faulty as at sea level. But give him oxygen and he immediately becomes his own amiable and intelligent self.

That's what lack of oxygen does to a man's psychological processes. Now what does it do to his brain physiologically?

The physiologists said they'd investigate that, and a chap named Himwich, in Albany, took on the assignment. Usually the physiologists confine themselves to mice, guinea pigs, dogs,

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and the like, having little truck with humans. But this was question of mental disorders, and since animals don't have any mental disorders to speak of, Physiologist Himwich knew that eventually he'd have to use human guinea pigs. But he could start with dogs.

It was believed that with both insulin and metrazol shock there was, among other things, anoxia — that is, that the brain (as with Pilot Adams) suffered from a lack of oxygen. So first of all, Himwich thought he'd like to see this with his own eyes. But with his own eyes he saw something even more curious.

He puts one of his laboratory dogs into insulin coma. Then he draws from a vein blood which is returning from the brain after having delivered its oxygen. This blood would, of course, lacking oxygen, be bluish. All venous blood is. (Look at the veins in your wrists.) But instead, Himwich finds, it's bright red!

So he gives a second dog metrazol convulsions, and draws from the arteries blood carrying oxygen to the brain, which would, of course, be red. . . . And it's blue!

Shock with insulin — red blood in the veins.

Shock with metrazol — blue blood in the arteries.

Well! — Figure that one out!

Himwich tackles it. The body gets its energy from combustion, he begins. For combustion you need two things — fuel and oxygen. The fuel of the body consists of fats and carbohydrates (sugar). The oxygen is in the air we breathe.

Insulin burns up one of the fuels of the body — sugar. Deprived of one fuel, what will the body naturally do? Burn its other fuel, of course — fats.

But if the blood coming from the brain is bright red, showing that no oxygen has been withdrawn from it, that can only mean one thing: that the brain, unlike every other organ in the body, cannot and does not burn fats. It burns *only* carbohydrates. Therefore, deprived of its only fuel by the insulin hypoglycemia, it is immediately knocked out, long before the heart, liver, lungs, muscles, which can still burn fats, are knocked out.

This, Himwich is forced to admit, is a very unorthodox phenomenon.

As for the blue blood in the arteries of the metrazol-shocked dog, that can only be explained on the ground that the violence of the convulsions prevents breathing and so no oxygen is taken up by the blood. Metrazol convulsions produce true anoxia. The shock with insulin does not produce true anoxia, but a secondary anoxia. In neither case does the brain *use* oxygen. The end result, with either drug, is the same. With insulin the fuel is removed. With metrazol the draft is removed. In either case — no fire. No fire — no energy. No energy — unconsciousness.

Now — is it this loss of cerebral energy which brings about the improvement? Of all the factors involved in these two forms of shock, is it the anoxia which works the cure? In a word, will anoxia pure and simple do the trick — as it sometimes does in hanging? To determine that, we must separate anoxia from the rest of the shock treatment, isolate it, and give it in its pure form.

But now he has reached the point where dogs won't serve any longer. He must work with humans.

So Himwich takes the train to New York and goes to see his old friend Karl Bowman, Director of the Division of Psychiatry at Bellevue Hospital. Face to face with the psychiatrist, he states his case.

Suppose you do just one thing to a schizophrenic, he says — deprive the brain of energy? And suppose he gets well? Then all we'd have to do in future is just that one thing, no more. No long complicated treatment with drugs, just — anoxia.

And how does he propose to do just that? Bowman wants to know.

Well, there's this apparatus — He begins sketching hastily on a scrap of paper — tank, tubes, mask, cocks, meter. You adjust the mask, patient begins breathing this gas, a mixture of nitrogen and oxygen, you gradually decrease the oxygen . . .

Yes, of course, but schizophrenics don't get well merely by being deprived of oxygen. Occasionally one may recover after hanging — but only temporarily. In a few weeks —

Right. But did a lunatic ever get hanged — and hanged — and hanged?

Well, no.

So you see what he proposes to do is different. He proposes to repeat this anoxia day after day until he gets a period of lucidity and then day after day after day until the remission becomes permanent, or until it's hopeless. But anyway, that end of it is up to Bowman. He, Himwich, is not a psychiatrist. It's not his job to cure people. It's his job to find out if anoxia is a necessary step in the cure. If it is a necessary step, then the question becomes: Will anoxia *alone* do the trick? Doesn't Bowman see?

Bowman sees all right, and he sees what Himwich is after.

Right! Himwich wants to try anoxia on schizophrenics. It's absolutely safe, he hurries on. A number of other men have tried it on animals and all pronounce it perfectly safe. No fatalities; he could guarantee that. And no bone-breaking convulsions, either.

Fair enough; but still it's just an experiment. Bowman isn't running a laboratory. So —

But it might — it easily might — restore these patients to sanity. Then it would be, not an experiment, but a *treatment*. And that would be right down Bowman's alley.

Well, perhaps it wouldn't hurt to try. Only —

Fine — fine! When do we start? Next month — fine! You know if this *should* do the trick, then shock treatment is no longer empirical. It is rational. It is science. And that would be something.

That would certainly be something, Bowman agrees. They shake hands on it.

Promptly on the day appointed, Himwich stands over Experiment No. 1, who is stretched out on a treatment table. The anesthetist is ready, the attendants are ready, the big tank on the floor, adjusted to deliver its nitrogen and oxygen mixture, is ready. All set?

They drop the mask over Experiment No. 1's face, let the gas flow. Not much more to it than taking gas in a dentist's chair, it seems. Ah, yes, now we see the first tremors of the

finer muscles, and then, as layer after layer of the brain succumbs to the oxygen deprivation, the grosser reactions appear, just as in insulin coma. The involuntary movements of the body become larger, wider. At first they are mere twitchings, then tetanic postures, and finally the legs and arms are thrown wide — up, up in the great extensor spasms. Swiftly, too swiftly for the untrained eye to catch, in a matter of seconds, the descent to lower brain levels exhibited in insulin coma takes place, but now as in a terrifically speeded-up movie.

That final spasm, indicating that the lowest brain level has been reached, is the signal. A rush of oxygen along the tube, the rigid muscles relax, the patient lies quiet.

Experiment No. 1 opens his eyes, gets up, and walks out grumbling. Doctors are nuts!

That is the anoxia treatment. Merely as a method, it is, as you can see, clearly superior to both insulin and metrazol. It really doesn't amount to much more than taking gas to have a tooth pulled. But does it work?

From that day in 1937 when Experiment No. 1 was put on the table, up to 1941, Himwich and his colleagues worked their way slowly up to Experiment No. 17. Their report reads: five complete remissions, five greatly improved, two slightly improved, five unimproved. Over a year after treatment, the improved patients were still holding their own.

Not too bad. But there's a catch to it. In two cases nitrogen was followed by insulin — to consolidate the gains made by the gas. Also, the nitrogen treatment was generally accompanied by psychotherapy.

So anoxia at Bellevue wasn't quite as pure and simple as Himwich planned. Trouble is, these psychiatrists want to get people *well* — and they don't care how. They'll throw a beautiful experiment down the drain any time to get a cure.

In 1941 Himwich started treatments at Brooklyn State Hospital, "where they have a very rich material." In the end he proved (which was what he was really after) that depression of brain metabolism plays a significant role in the alleviation of schizophrenia. His opinion as of today is that depriving the

brain of energy has undoubtedly something to do with bringing about favorable changes. It almost surely is not the whole cure — it certainly looks as though it were part of it. At one point they were getting  $33\frac{1}{3}$  per cent recoveries with patients ill a year or less — better than spontaneous recovery. But will they stay recovered? To that, time is the only answer. Anoxia is still in the experimental stage and most authorities are of the opinion that it would never accomplish what the other shocks do. If it could, it would be a great gain for it is a comfortable armchair procedure in comparison. . . . As we said, this is just a peep behind closed doors.

And now (it is 1941) we come to a door that is not open even a crack. Something is going on behind that door so new that no report has yet appeared in the medical journals and many psychiatrists even have not heard of it. It is so different that it is not actually a shock treatment at all. It is so experimental that so far only ten patients have been treated. And yet —

Hear Dr. Abraham Myerson, Director of the Psychiatric Division of the Boston State Hospital: —

"What would you think of this?" he asks. "Take a schizophrenic patient who, for two years, has been completely inaccessible. Nothing we can do or say penetrates her indifference, nothing arouses the proper emotional response. 'Your mother is dead.' She grins — that sort of thing. She is violent, destructive, full of disgusting habits and foul language.

"But *now*: we reduce her bodily temperature from the normal  $98.6^{\circ}$  to  $97^{\circ}$ , to  $96^{\circ}$ , and at  $95^{\circ}$  she suddenly begins to speak to us, irrelevantly, it is true, but nevertheless, for the first time in years, she *converses*. Over a period of twenty-four hours we carry her temperature down to  $89.5^{\circ}$ , and when it reaches that point she becomes a lady of culture and charm, conversing rationally and entertainingly. In twenty-four hours! And she remains rational for as long as her temperature is kept at this level — for four hours. But now we let it rise, and as soon as it reaches  $93^{\circ}$  she again becomes disoriented and aggressive,

and finally, when it reaches 98.6°, she is in her usual mute and combative state. After her third low-temperature treatment, a few weeks ago, she remained greatly improved even when her temperature was allowed to return to normal, and has remained so. Well, what would you say to that?"

What would anyone say to that?

"I personally don't believe we ever really *cure* schizophrenia," he continues. "Not by insulin, not by metrazol, not by the electric convulsive shock, not by anything. We may remove the symptoms; the schizophrenic note remains. However, to remove the symptoms and enable the patient to lead a happy and useful life, even though he may always be 'a little touched,' is already something — though *I* would never call it a *cure*."

"This new low-temperature treatment is more provocative than anything we have done so far. Why? Because it attacks a more fundamental process of living. The shock treatments all attack primarily the brain. This goes deeper. The whole organism is built up around heat. Every organ, every cell in the body depends upon heat. Therefore, when you reduce the temperature to these all-time lows, you are striking at the life of every cell in the body, not merely at the brain."

"Yes, I'm a skeptic. Yes, I believe schizophrenia is constitutional and hereditary. Yes, I'm convinced it's the result of a physiological, a chemical change in the organism; *but* — it may not be an irreversible change. It may be only some little simple thing that has gone wrong with the machinery which, once located, can be quite easily set right."

"My reason for thinking this is that there are so many spontaneous recoveries and that it is almost always possible to produce a temporary improvement with drugs. A little sodium amytal or benzedrine, and your most obdurate schizophrenic becomes responsive, gay, and friendly. Therefore it can't be a condition inaccessible and unalterable. . . . So you see, I'm not such a horrid pessimist after all."

And now what was this low-temperature treatment in which even the ultra-critical Myerson was so interested?

At a medical conference held in St. Louis in the spring of 1939, a small exhibition booth for motion pictures was set up

and all week the doctors stood in rings craning to get a look at it.

It showed a woman, naked but for a loincloth, lying on a bed of cracked ice with more cracked ice piled up around her. With an electric fan blowing upon her, she slipped first into a pleasant drowsiness and finally into dreamless sleep.

Dr. Temple Fay, of Temple University, Philadelphia, explained somewhat as follows: —

"Some time ago we began treating cancer by local freezing and we saw an improvement in the cancer cells with consequent relief from pain. So why not, we thought, try freezing the whole body to attack inaccessible cancers? *Why* not? Because we were afraid of what such general reduction of bodily temperature might do. We were very much afraid. We believed that the body could not survive temperatures below 95°.

"But then we thought: we were afraid of what excessively high temperatures would do — until we found that fever burns out syphilis.

"So we tried general freezing. And what did we discover? That we could force the body temperature down five degrees — ten, and the patient, far from dying, merely fell into a deep and comfortable sleep. Then when we raised the temperature, she awoke smiling, not only none the worse, but much the better for her long, frozen sleep. She had forgotten everything in between. The two ends of her slumber joined — and she had merely lost five days.

"This sleep looks like death. There is no pulse. It takes the electrocardiograph to detect the heartbeat. All bodily activities are suspended — of the kidneys, bowels, digestive organs. It is artificial human hibernation. We have discovered that man, like certain animals, can hibernate. Long ago the India fakirs discovered that.

"These patients should, of course, die of pneumonia. Any man in this audience would be ready to write the death certificate of a patient whose temperature was brought down, and kept down for days, to the lows we've reached — 85°, 82°. But they don't die.

"And we know now that the growth of cancer cells cooled

to 90° is arrested. We know that pain is eliminated sometimes for as much as five months so that patients can do without narcotics. And we know that they have a feeling of general well-being.

"But besides these proved things, there are things guessed at. Might this hibernation not arrest tuberculosis? Might it not be beneficial in heart diseases? Might it not help in drug addiction? Might it not — cure insanity?"

That was in May, 1939. One year later, almost to the day, two Boston doctors, Dr. Tillotson, Psychiatrist-in-Chief at the McLean Hospital, and Dr. Talbott, prepared their first schizophrenic patient for this freezing treatment. The apparatus used was no longer an amateurish bed of cracked ice but a very technical affair called a Therm-O-Rite, a sort of pack blanket with an attachment for the head containing induction coils and tubes through which circulates a solution of glycerin and brine. Under a light narcotic to avoid the initial shock, the patient is wrapped in this blanket and soon falls into a dreamless sleep.

They were cautious. They took their first patient down only to 87° — but even that was lower than any human being had ever deliberately been taken except in the experiments at Temple. Later they went as low as 74.6° — 24° below normal — and still the patient slumbered peacefully.

Their first ten cases were all guaranteed schizophrenics, certified by at least five psychiatrists, and ill from one to twenty years. Tillotson and Talbott were not men to do things the easiest way, nor yet the next easiest, but furious men, determined if this thing worked to know *how* and *why*. They summoned to the bedsides of these hibernating patients scientists from many fields. Not only were all the resources of the McLean Hospital at their disposal, but also those of the Medical Clinic of the Massachusetts General Hospital and of the Fatigue Laboratory of Harvard University. So that frequently no less than twenty-five gimlet-eyed scientists, armed with every sort of medical gadget you ever heard of, and some you never heard of, gathered around these frozen slumberers and began prob-

ing into practically every process of the organism. That way they figured they should catch the mechanism of madness at work, surprise the secret comings and goings of schizophrenia. And at the very least, if they got *no* cures, they would have amassed an immense amount of data as to what happens to the human organism at these unholy temperatures, which should certainly come in handy.

Result?

Four patients showed marked improvement. Three showed slight temporary improvement. Three showed no improvement. One died.

Dr. Tillotson pronounced this "encouraging." On the basis of ten cases, one can't say much more; even this much might seem to some an unjustified optimism. But pioneers must be enthusiastic. It is even helpful if they can be fanatics.

No scientist goes to town with ten cases. But just as they were getting started on a bigger and more beautiful experiment, came the war, and all the stir and bustle behind that closed door at McLean died down. What might come of their experiments, if and when they start up again, even they can't guess. Probably more scientific data than cures. Dr. Myerson still bends an attentive ear.

And now, to conclude our account of the tremendous activity stirred up some nineteen years ago by a young man who was sure he could think his way through a stone wall, suppose we glance for a moment at the latest developments in his shock treatment.

However successful the shock with insulin and its accessory drugs may be in acute cases of schizophrenia, there are still those chronic cases to worry about. So Sakel and others are working on a prolonged coma or "condensed" shock.

You remember the theory of the murdered neurons? That's where Sakel starts.

"We do not, in early cases of schizophrenia, intentionally destroy brain cells. There may, at times, be unintentional and insignificant destruction of cells, but this is not the aim of the classical shock or the way the remission is brought about.

"We start with the premise that certain groups of cells in the nervous system have gone berserk. The conspicuous subversive activity of these cells completely overshadows the inconspicuous normal activity of the far greater number of normal cells. Only a fraction of the cells may act 'crazy,' yet the whole man appears to be insane because of the strange, the intense, the dominating activity of these abnormal cells. It is the dysfunctioning of this highly vocal minority which is the root of the disorder and which must therefore be suppressed.

"When an adolescent commits a crime we send him to a reformatory, hoping to reform those elements in his personality which have made him misbehave. So with the dysfunctioning cells in an early case of schizophrenia. The abnormal functioning of these cells is so recent that we believe that, with insulin hypoglycemia, we can subdue and reform their faulty activity. For insulin hypoglycemia goes deep, affecting practically every function of the living cell.

"But with chronic schizophrenics, as with confirmed criminals, we can't hope for reform. Here the faulty pattern of functioning is irrevocably entrenched. Hence we must use more drastic measures to silence the dysfunctioning cells and so liberate the activity of the normal cells. This time we must *kill* the too vocal dysfunctioning cells. But can we do this without killing normal cells also? Can we *select* the cells we wish to destroy? I think we can.

"When we give a schizophrenic patient a light dose of insulin, not enough to produce coma, a curious thing happens. He often becomes lucid for as long as the effects of the drug last but, on getting glucose, immediately reverts to his insanity.

"What does this indicate? It indicates that those overactive, abnormally functioning cells which are producing the picture of disorder are the *first* to be affected by the insulin. *All* the cells are being *equally* deprived of nutrition (the sugar which is the source of their energy), but the 'crazy,' overenergetic cells, needing more nutrition than the hibernating normal cells, are the first to feel the sugar blockade and therefore the first to be knocked out. They can no longer dominate the picture;

the normal cells, liberated from the dominance of the dysfunctioning cells, take over; and the individual appears sane again.

"From this conception I sought to develop a way to enable us to select for elimination the undesirable cells and to perform, so to speak, a selective, microscopical brain 'surgery.' The present shock, lasting, say, from four to six hours, does not kill brain cells; it merely, by repetition, gradually normalizes the activity of these abnormal cells. But there is a limit to the time this shock can be continued without causing actual, and sometimes irreversible, destruction of cells. Exceed this limit, with due caution of course, and the cells selected for destruction will be irretrievably destroyed, and *only* those cells — only the overactive 'crazy' cells which feel the sugar blockade first and most. Destroy them, and your patient recovers his sanity.

"I tried this prolonged shock on a small series here in America, only six cases, since I have no clinic. All had been hopelessly deranged for from three to nine years. The results of treatment were: Two failures. The other four? One girl had been ill for seven years, five years an institutionalized 'straitjacket' case, with no human contact, recognizing no one, speaking only to the birds and her 'voices,' claiming that her husband was a Negro, several times attempting murder. A prominent psychiatrist said of her, 'Her chances of recovery are exactly zero.' To-day this woman is a brilliant international hostess, married to a man of high position, successfully coping with all the functions of her exalted social position. She has been completely well now for over three years.

"Another woman, living abroad, who had been severely ill for years, was brought to America for treatment by ship, in spite of the dangers of sea warfare. After prolonged shock with coma lasting up to forty-eight hours, taking her to the very brink of death, she completely recovered. She is today a prominent figure in society, a well-adjusted and happy woman of considerable intellectual attainments.

"A third patient made an equally good recovery, and the fourth made a social recovery. But with four out of six remissions, I have the utmost confidence that, with this admittedly

dangerous treatment, properly applied, a goodly number of chronic cases can be cured. I certainly wouldn't advise any but the most skillful and experienced men to attempt it for it must go to the limit of danger, achieving an almost, but never deliberate, irreversible coma."

"Pure theory," some psychiatrists will say, "without physiological foundation." There are even men who deny that any shock treatments ever "cure," even early cases. They may admit "improvements," "social recoveries," but never cures.

"With schizophrenia," these skeptics say, "there are no recoveries due to any form of shock or any other treatment. Some patients may be better behaved for a while, after shock treatment, have a few symptoms lopped off, but they are never cured. Once a schizophrenic, always a schizophrenic."

It is only fair to state this extreme view, which is held by a number of prominent men. It is not the view of the majority of psychiatrists.

From this pessimistic attitude to that of Sakel we have every shade of opinion. Figures on recoveries run all the way from 3 per cent to 90 per cent, Sakel's figure. (A good average would be about 55 per cent.) That variation, says Sakel, is the most hopeful aspect of the whole picture. For if results are so variable, that can mean only that the cause of failure lies rather with the men who give the treatment than with the treatment itself. Raise the ability of the least able in the field to that of the best (or somewhere near it) and you will get uniformly good results. There's nothing wrong with brain surgery — but some surgeons are certainly superior to others.

That about covers the various shock treatments, all the result of only nineteen years of intense activity. So far physiological shock has proved to be the most effectual attack on the major insanities. Take neither the pessimistic viewpoint of men like Brill and Myerson nor the enthusiastic viewpoint of men like Sakel and Meduna, but that of the middle-of-the-road men, the majority of our psychiatrists, and even so you will find plenty of reason for optimism. We *are* getting somewhere, no doubt of it, in this fight against madness.

But progress has not been confined to these shock treatments.

Encouraged by the resounding successes in this field, men in every branch of medical science have been working to unearth new facts concerning mind and new ways of treating it. Some of their findings, if, up to the present moment, less successful therapeutically than the shock techniques, are quite as startling and as illuminating psychologically.

The transformation of the personality by drugs is one of the oldest dreams of man. Mythology, folklore, fairy tale, religion, abound with such transformation scenes. And the dreams of man have an uncanny way of coming true — as witness his ancient dream of flying.

Take this man Stockings — G. Tayleur Stockings. His drug was mescaline. He swallowed a dose he thought should do something pretty drastic — and awaited results. He wondered afterward if all the things could have happened that he thought had happened. He decided to experiment further.

Human beings are forever fascinated by the idea of "experimenting." So Stockings didn't have too much trouble in persuading a group of normal individuals to try this extraordinary experiment of his. He warned them that they would probably go, temporarily, quite, quite mad — and still they were willing.

And sure enough, within thirty minutes of taking the drug, they began to exhibit all the symptoms of a schizophrenic during an acute episode — hallucinations, delusions, depersonalization, disorientation, disturbances of thought, motor activity, mood. They went through all the silly and stereotyped grimaces and postures of the completely demented — smirked fatuously, laughed wildly, cast sidelong glances of suspicion, assumed attitudes of religious ecstasy, ranted meaninglessly, became violent, reckless, belligerent. There could be no doubt that, for twelve hours, they were mad as March hares.

So, concludes Stockings, since a condition indistinguishable from insanity, even to an expert, can be induced by a drug, may not actual insanity be caused by poison in the system?

So now let us look in on the endocrinologists and biochemists, those wizards of the test tube who, with drugs, hormones, and vitamins, may yet make Supermen of us.

#### XIV

### *Formula for a Superman*

WE enter a small room in a psychiatric hospital. On a high, narrow bed lies a man in his ordinary street clothes but equipped with a strange headdress. To his head and the lobes of his ears have been pasted many small metal electrodes attached to fine wires which are plugged into a miniature telephone switchboard.

"This is Joseph Engels," says Dr. Shirer, introducing the patient. But the man merely continues to stare into space, motionless and apathetic. Whether he does not hear, does not wish to answer, is frightened, negativistic, mute, unconscious, it would be difficult to say.

Dr. Shirer leads us to an adjoining room. There, on a bed, lies a man who looks exactly like the first and with the same strange sort of device attached to his head.

"This is Ben Engels," says Dr. Shirer, and this man too continues to stare into space, speechless.

"Now'll we'll go to the laboratory," says Dr. Shirer.

The laboratory adjoins the two small treatment rooms. On a table against the wall stand two machines which receive the wires from the two strange headdresses. Each of these machines, we are told, is an amplifying and recording system, consisting of vacuum tubes, an ink-writer, paper tape, and so on. To record and amplify what? We shall see.

From the ink-writers the tape, on which the machines are scrawling a record in purple ink, flows steadily. Dr. Shirer takes a yard of it between outstretched arms and reads it

swiftly. The unintelligible scrawl seems to make sense to him.

"This may prove very interesting," he says. "Those two men, as you saw, are identical twins. We have taken their records a number of times. Today we are taking them simultaneously in the hope that — But let's begin at the beginning.

"I don't think we've ever discovered anything more curious about these curious minds of ours than what Hans Berger of Jena discovered in 1929. He discovered that *the brain beats electrically*. Now, since electrical impulses can be registered, what is to prevent our making a record of its beating — as we make a record of the beating of the heart? An electro-encephalogram, or brain record, like an electrocardiogram, or heart record?

"Entirely possible, he found. Although the voltage obtained from the brain is only about 1/100 of that produced by the heart, we can, with these specially designed amplifiers, detect and register it by attaching electrodes to the surface of the head.

"And what did these electro-encephalograms reveal? That one brain beats differently from another. That for each of us this brain record changes with age, with consciousness, with variations in the physicochemical state of the body. That it is different for normal and abnormal brains, normal brains beating rhythmically, abnormal brains dysrhythmically. That it is very different for an epileptic, and, especially during a seizure, for each type of epilepsy — the *petit mal*, partial unconsciousness, the *grand mal*, total unconsciousness, and the psychic seizure; and different again in an epileptic during a seizure and during the periods between seizures. This last difference is what we hope to see demonstrated now as the records come to us on this tape from the brains of those two men, both of whom are epileptics.

"Here at the beginning of Joseph Engels' record note the type of line the machine has traced — a relatively flat series of waves which records the man's interseizure cortical activity. Now look at this other strip, brother Ben's record. Practically identical. A curious thing is that both of them have been having

weekly seizures, occasionally at almost the same time, and one is about due now. So we thought we'd try for simultaneous records. Just a fluke, of course, if we get them."

He reaches toward a shelf where are piled packets of paper tape, a strange library of records written directly by the brain.

"Here," he says, selecting several and opening them, "are the records of normal people. They all trace a more or less sinusoidal wave with a frequency of approximately ten per second, but with the voltage varying greatly from one individual to another. A second of time is represented by about three quarters of an inch on the tape.

"Now here," selecting another packet, "is the record of a woman with *petit mal* seizures. What we call the wave-and-spike pattern — an alternation between a fast and a very slow beat, the duration of each wave-and-spike being about one third of a second. That, of course, is very much slower than the normal brain beat of ten waves per second. It is obvious at a glance that here we have a very abnormal electrical activity of the brain.

"Then take this record, made by a brain during a *grand mal* attack. Here the beat is much faster than that of a normal brain, almost twice as fast. The waves are all jagged, tall, and spiky. But notice here at the end, after the convulsions were over and the subject was in stupor, that we have slow, slow waves, little lapping waves."

All this time Dr. Shirer has been glancing at the tape flowing from the two machines. The violet ink continues to trace fairly regular low waves. He selects another record.

"Now here is a remarkable case. You see how it is captioned: 'College girl who disappeared after several attempts at suicide with no adequate provocation'? Compare it with this one: 'Problem child sent to a reformatory, said to have a psychopathic personality.' Well, what do we see in these two records? Waves totally unlike those made by a normal brain and yet entirely different from those of *grand mal* and *petit mal* seizures. Both of these records show slow square-topped waves exactly like those we see in patients with psychic seizures.

"That's rather startling. Because it tells us that people who may appear quite normal, having no symptoms whatever of epilepsy, may yet have exactly the same abnormal electrical brain pattern as a fullfledged epileptic. Just as there are borderline cases of insanity, so there is 'an epileptic fringe' — individuals who have none of the overt symptoms of epilepsy, who never convulse, but whose brains nevertheless beat in an electrical dysrhythmia similar to that of the true psychic epileptic, and who are therefore mildly epileptic. This epileptic fringe includes many suicides, many problem children (for epilepsy is primarily a disorder of childhood), individuals with personality disorders, and about half the near relatives of epileptics.

"They believe themselves normal, these borderline epileptics. Others believe them normal. And all the while their brains are beating out an epileptic dysrhythmia. Strangest of all, while not epileptics themselves, they may transmit epilepsy to their offspring. The curious aberrations of behavior and of brain activity of these people may show itself as epilepsy only in their (perhaps distant) descendants. You may consider the chances great or small. By actual figures, according to one authority, Dr. Lennox, they are one in fifty. The chances of an epileptic having an epileptic child are one in forty — only slightly less. Many people might consider a one-to-forty or one-to-fifty chance not bad odds, but as against the chances of a person with a normal electro-encephalogram having an epileptic child (one in five hundred) they can't be said to be actually bright. These 'carriers' of epilepsy can now be discovered through the electro-encephalogram. And believe me, that's not unimportant since there are about fifteen million of them in the United States today."

Suddenly he seizes the tape issuing from one of the machines.

"Ah, here it is! Joseph Engels' record. A psychic seizure — you see! Here, here, watch it."

Something extraordinary must be going on inside the head of the man in the next room for we see the once smooth waves break into a turbulent pattern, a succession of slow, square

waves followed by large amplitude, moderately slow waves, the typical psychomotor seizure pattern, the psychic equivalent of a convulsion.

They cease. The machine resumes a flat wave line. The attack is over.

"These are the waves that warn 'Beware!'" says Dr. Shirer, still studying the square-topped waves. "This type of attack is potentially more dangerous to the patient and to those around him than either of the other two, for although usually during an attack the victim is harmless, there are times when he suffers strange compulsions. Such a man, as if acting out a dream, may commit murder. He may appear to be fully conscious, to be killing in cold blood, but actually he may be unconscious and remember nothing of what he has done. This is the type of epileptic who has given this strange illness, which is sometimes insanity and sometimes is not, its bad reputation. . . . Ah! Ah! Here we have it." He seizes the tape from the second machine. "Ben is having an attack. That is really extraordinary. And see, we have exactly the same sort of pattern as on Joseph's record — not simply a dysrhythmia but the same type of dysrhythmia. Remarkable. How can we doubt that epilepsy is hereditary?"

That is the story told by the electro-encephalograms of a pair of identical twins.

But what has all this to do with biochemistry?

Well suppose, just suppose, a drug could be found *to stabilize the beat of the epileptic brain?*

Is it beyond the bounds of possibility that such a drug might be found? Since the dysrhythmia of epilepsy is a disturbance of the electrochemical activity of the brain? Since it is hereditary and therefore potentially influenceable by physiologic and chemical changes in the brain? Since it is often the result of a chemical deficiency or abnormality either in the plasma or in the brain itself? Since, finally, the abnormal wave-and-spike pattern of *petit mal* can be temporarily abolished by the inhalation of a drug, carbon dioxide? .

All these considerations started the neurologists off on the

hunt for a drug that would favorably influence abnormal brain waves.

And at last Dr. Houston Merritt of Boston and Dr. Tracy Putnam of New York hit upon sodium diphenyl hydantoinate. Call it dilantin for short. After a two-year trial they reported on 350 cases as follows: —

That, used on *petit mal* patients, dilantin completely relieved 37 per cent and greatly reduced the attacks of an additional 20 per cent.

That of their *grand mal* patients it completely relieved 60 per cent and greatly decreased the number of seizures in another 14 per cent.

That for psychic seizures it was best of all. Here it completely relieved 62 per cent and greatly reduced the number of seizures of 23 per cent more.

After a five-year trial, treating thousands of cases, they report that these figures still stand up.

In 1945 Dr. W. G. Lennox of Boston, a pioneer in the study of the cerebral dysrhythmia of epilepsy, reported: —

"I have used dilantin on hundreds of patients with *grand mal* or psychomotor seizures. About 75 per cent of them got rid of three quarters of their attacks."

But there were still those sufferers from the *petit mal* seizures, for whom dilantin did not work very well, who sometimes were even made worse by it.

So the biochemists went to work again. Knowing this: that epilepsy is a chemical disorder, therefore amenable to drugs, and that they had only to persist and keep on persisting to discover the drug they needed. And finally they got *one* that did it — well, *almost* all the time. And it was tridione. It proved to be one of those sensational drugs which do far more than is expected of them. Dr. Lennox tried it on thirty patients who were having from five to fifty *petit mal* attacks daily — and with dramatic suddenness two thirds of them ceased convulsing entirely, or almost entirely. Dr. Houston Merritt has tried it on fewer cases but with equally good results. Dr. Tracy Putnam, who has treated the largest number of such cases, says it is the

best drug to date for *petit mal* seizures. Of still another of the seven hundred or so anticonvulsant drugs recently developed, glutamic acid, he says, "It is clear that in over one third of the cases, there is a definite improvement, which is sometimes dramatic."

Epilepsy is curable. No longer need the half-million epileptics in the United States wander from doctor to doctor, bewildered, discouraged, and still convulsing. Drugs have been found which can transform a personality for the better — dilantin, tridione, and glutamic acid for epileptics. It looks as though one more disease which may run to insanity had begun to yield to medication. If now those borderline cases, that epileptic fringe — problem children, adults with personality disorders, potential suicides, people in whom a cross word may be the only outward expression of a series of slow waves of high voltage — are found to be amenable to this new drug, what a stride forward psychiatry will have made! And it looks, it really does, as though this might come about. Fiction pales before science.

A way to "listen in" on the brain, that was what the encephalogram was. So perhaps, the psychiatrists argued, it may be able to reveal other secrets than the dysrhythmia of epilepsy. And sure enough, it now appears that it can detect and record other abnormalities. It can help not only to distinguish between one kind of mental illness and another but even between one type of schizophrenia and another. It can also accurately locate many sorts of brain lesions, thus guiding the hand of the surgeon. It may prove to be a new and valuable diagnostic tool, free from human error.

For one thing, in the famous word-association tests originated by Jung, the encephalogram gives a far more accurate record of the mental and emotional reactions of the subject than does the human examiner. It may eventually help in breaking down a general scrap-basket classification like schizophrenia into many well-defined entities, in each of which different and distinct disease processes may well be involved, thus enabling the psychiatrist to prescribe treatment more intelligently. Already, in some hospitals, all three types of shock treatment are being

used for schizophrenia in accordance with the indications of encephalography.

To continue.

In asylums today, in the same wards with schizophrenics, paranoiacs, and those with confusional or manic psychoses, and indistinguishable from them, are men and women who have no more the matter with them than —

We must go back to 1906. In that year a Dutchman, Funk, discovered a small item of our internal chemistry the existence of which had never even been suspected. In one year we Americans spent \$100,000,000 to rush this chemical to our systems. Deprived of it people grow weary, dull, impotent, even sicken and die. It isn't, like the hormones (which we are coming to in a moment), manufactured by the body itself, but comes to us in the food we eat. Therefore are we the more easily deprived of it. Thus deprived we suffer from a deficiency disease. Deficiency of what? Of that small item the Dutchman discovered in 1906. Vitamins.

What have vitamins to do with mental and nervous disorders, with the smooth functioning of the mind? This: —

Vitamin deficiency can lead to confusional states indistinguishable from insanity. The victim of delirium tremens evidences symptoms of insanity. The victim of pellagra likewise. Both suffer from vitamin deficiency.

Pellagra. . . . A million victims a year in the United States alone, a number of whom become psychotic. A skin disease at the start — as syphilis is, the syphilis which can go on to paresis. A mental condition due specifically to lack of a vitamin, nicotinic acid.

Nicotinic acid, until a few years ago, was merely a chemical curiosity. For fifty years it had been stowed away on laboratory shelves without anyone's suspecting its life-and-death role in our internal chemistry.

Then one day a young biochemistry professor at the University of Wisconsin, Conrad Arnold Elvehjem, who was experimenting with some dogs he was trying to cure of black-tongue, took down a dusty bottle from a shelf and began

giving its contents to those sick dogs — and the dogs got well.

So, said young Elvehjem to himself, since blacktongue is first cousin to pellagra — !

A mental disorder cured by vitamins! Cured, literally, by eating your spinach! Would it work?

They began giving nicotinic acid to those pellagra patients who had all the symptoms of various major psychoses, and they literally ate their way back to lucidity.

What made these new victories harder for the psychological schools to bear was that they also cut a slice off those milder mental disorders represented by neurotics, problem children, and queer personalities, which they had always held to be pre-eminently their domain. When suicidal impulses and chronic misbehavior can be shown to be associated with abnormal brain waves, when personality disorders can be traced to a lack of vitamins, what then of the Oedipus complex and inner conflicts?

The part played by the vitamins in our mental health may well turn out to be enormous. Already we have discovered enough of them to use up a large part of the alphabet and we know that the lack of one of them alone, B<sub>1</sub> (thiamin), can lower our vitality to a point where we become demoralized. . . . Chalk up one more victory for the biochemists.

Meantime they are opening up another approach. Would it ever occur to you that a man might go mad through an allergy to certain substances? He can. The nervous system may be allergic to certain substances with the result that, instead of an attack of hay fever, asthma, or a skin disease, the victim becomes mentally disordered. Children who are nervous, excitable, and irritable may merely be expressing the antipathy of their nervous systems to certain proteins, and when these are removed from their diets their attitude toward life changes radically. Certain types of epilepsy, even, have been found to be due to an allergy to milk, cereals, or eggs. This discovery opens up a whole new field to the biochemical approach to mental and nervous ailments.

All of which shows us that it is now not a matter of centuries,

perhaps not even of decades, before many more of the mysteries of mind will yield to science. Every year brings its discoveries, falling sometimes so thick that on consecutive days . . .

On December 29, 1941, the discovery of the secret of consciousness was announced — and it turned out to be, as all good biochemists expected, a chemical reaction. Consciousness, it was reported, is the result of activity of certain enzymes, which produce both chemical and physical reactions. They enter a chemical reaction which seems to destroy them but instantly come back ready to use again. When they temporarily fall apart unconsciousness results. The source of consciousness — that is the missing psychological link between plant and animal, just as speech was the long-missing psychological link between animal and man.

And on December 30, 1941, the very next day, the discovery of a method of extracting from bodily organs the factor (again, of course, a chemical) that governs shape, size, brain power, and very likely also temperament, was announced. This nucleoprotein is in the nuclei of tissue cells. The nucleus is a mere pin point in a cell which itself is microscopic, but the contents of this dot, by their chemical action, cause us to be formed as we are, even to the color of our eyes, to the shape of our noses, to the I.Q. with which we are born and from which we can never escape.

We come now to the endocrinologists.

Those who were not very happy about the place assigned to sex by the Freudians will be scarcely less pleased with the endocrinologists. Sex is their major preoccupation.

I sat one day in a doctor's waiting room. Two other people were present — a middle-aged woman and a young man, perhaps seventeen or eighteen. There was something disturbing and vaguely repulsive about him — you couldn't put a finger on it. He looked neither clean nor properly dressed nor amiable.

Then the two rose to enter the doctor's office and I saw that this was not a young man at all but a girl, dressed, in every way except the skirt, like a boy.

Several months later I was in the same office and there sat the same woman, but with her, this time, a pretty girl. Everything about her was attractive — her light, summery dress, her charming manner, her gay, responsive glances, her low, slightly husky voice. And yet there was no mistaking the likeness — she was certainly a sister of the unpleasant creature I had seen there before. I had the story from Dr. Kurzrok.

“Susan had never been a normal girl. She had never menstruated, had not developed breasts, but instead had the flat hips and thighs, the masculine body hair, of a young man. Psychologically, too, she was masculine, her interests, even in regard to sex, being those of a young man.

“The explanation lies in the glands. Two things make a woman a woman. First of all, sex is determined at the moment of conception. Every cell in the organism contains minute bodies called chromosomes. They carry on from generation to generation our inherited characteristics — blue eyes or a sense of humor, as the case may be. Every egg in the human ovaries always contains exactly twenty-four of these chromosomes, no more, no less. And every sperm in the male contains *either* twenty-four of these chromosomes *or* twenty-three. The egg contains always the same number, the sperm one of two numbers. (There is, in each twenty-three-chromosome sperm, an additional dot, much tinier than the other chromosomes, which some, like myself, don’t count, some count as one-half a chromosome, and some refer to as the y-chromosome.)

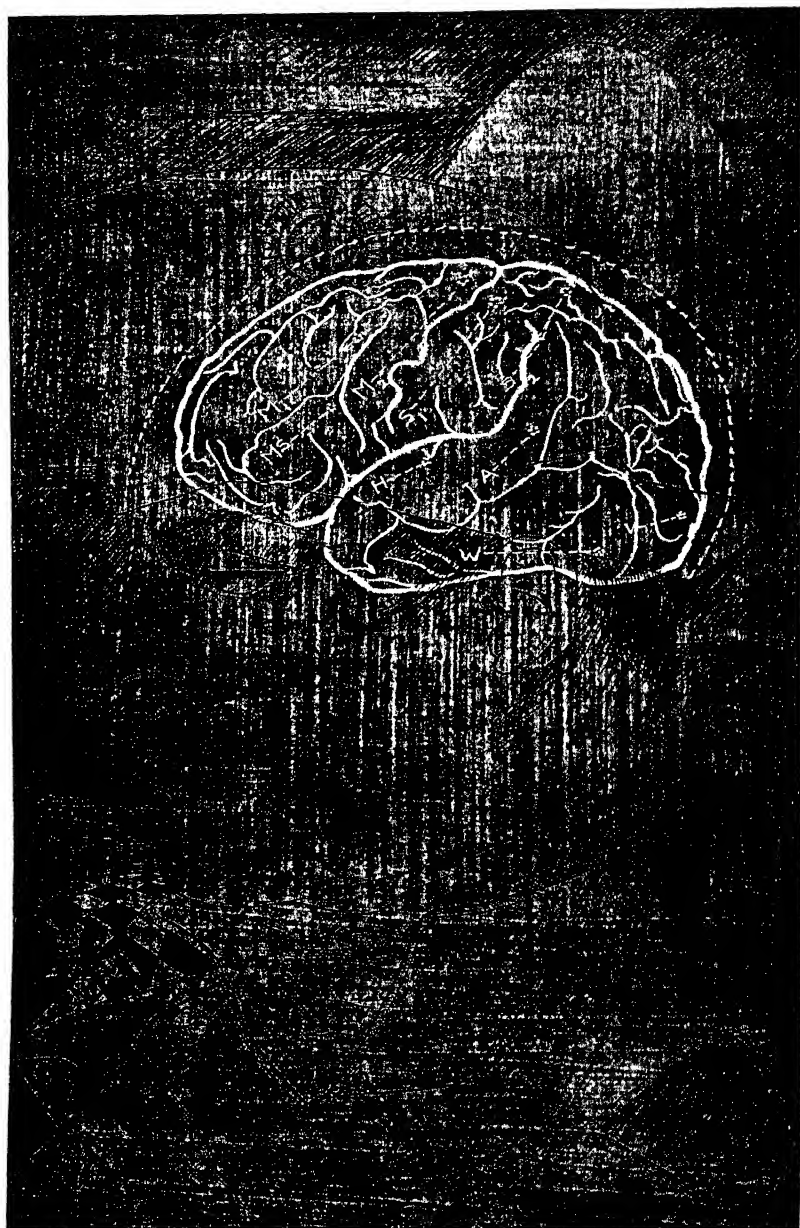
“Now. If a twenty-four-chromosome sperm cell unites with a twenty-four-chromosome egg, the child is inevitably a female. But if a twenty-three-chromosome sperm cell fertilizes the egg, a boy will be born. We are laid down as either male or female at conception. It is predestined. Nothing can change it. And it is our fathers who determine our sex.

“But — something else must happen during the course of our embryonic life to confirm our sex. Between the third and sixth weeks of uterine life, the sex glands begin to develop — the ovaries in the female, the testes in the male. Suppose something slips up and these sex glands fail to put in an appearance?

■

*The following portrait of Napoleon Bonaparte,  
after the painting by Girodet,  
shows the locations of  
certain functions in the brain*

■

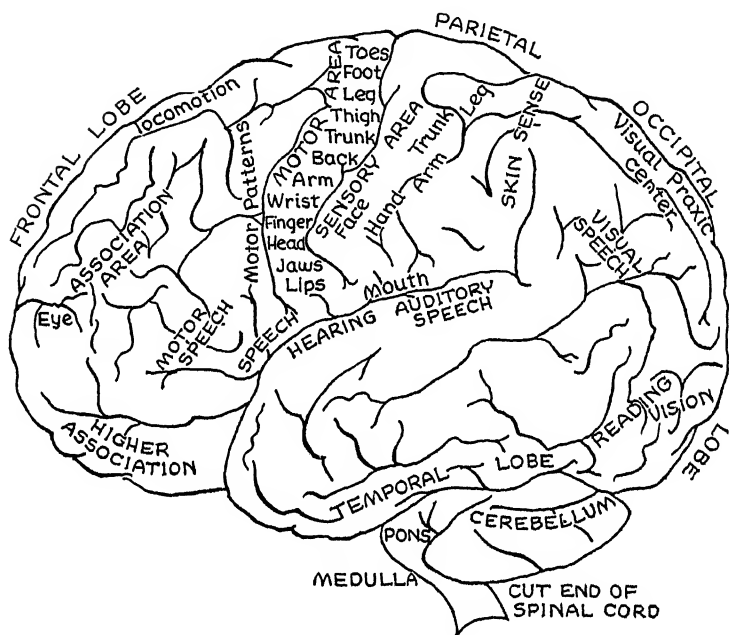


# EXPLANATION OF DRAWING OF NAPOLEON'S BRAIN

M<sub>1</sub> ..... \* = Manipulation  
 MS ..... \* = Motor Speech  
 M<sub>2</sub> ..... \* = Motor Area  
 S ..... \* = Sensory Area

S<sub>2</sub> ..... \* = Skin Sense  
 H ..... \* = Hearing  
 A ..... \* = Auditory Speech  
 W ..... \* = Word Hearing

Lateral view of the left hemisphere of the brain,  
 showing the exactness with which certain  
 Motor and Sensory Areas have been located



Napoleon's brain, which conceived the great Code Napoleon as well as his brilliant military strategies, was no different anatomically from any other normal human brain. In it the same centers for mental processes and functions were located in identically the same areas. The difference between his intelligence and lesser minds lay in the greater functional development of these centers and the Association Areas, particularly those of the Frontal Lobes.

It is superficial to deny the localization of various faculties of the mind and maintain that "the brain functions as a whole." So, to a savage, may an airplane appear to function. "Intellectual activity exists by reason of intact illimited association tracts

between an enormous — hitherto unimagined — number of ‘centers.’ A man is a huge complexity of special functional areas from which, by exquisite integration, a resultant of forces is achieved so that he may do one thing at a time.”

FOSTER KENNEDY

The localization of certain motor centers in the brain is so exact that stimulation of one small area results in the lips moving and of a near-by area of the jaws moving. A surgeon, by applying an electric current to successive areas, can cause one finger after the other to move. Definitely located centers are shown in the drawings on the two preceding pages. Naturally any such visualization of the working of the brain is schematic and symbolic.

That *can* happen. More often than most people imagine, — does happen. The woman is destined to be a woman because she was laid down with forty-eight chromosomes; the man is destined to be a man because he was laid down with forty-seven. But to be *strongly* one or the other, sex glands must appear. Say they don't. Say the ovaries fail to develop. Very well, the baby will be born a girl but one who, lacking ovaries, will be an incomplete woman, and the male child who doesn't develop testes will be an incomplete man. That is the explanation of these Susans, of whom there are many more than people suspect.

"Can anything be done for such a girl?

"Absolutely. It's very simple really, what we do in such cases — just a neat, small incision in the thigh, a tiny pellet inserted, a bit of adhesive tape strapped on, all over in three minutes. No major operation, no pain, no hospitalization, no long-drawn-out treatment. Just that little pellet — and the transformation begins.

"Within a few months your boy-girl is back. The minute she comes into the office you see the change: in her dress, which is now fastidious and feminine; in the make-up she is using for the first time; in her way of moving; in her changed voice; in the smile she gives you — a smile that recognizes that she is a girl and you are a man.

"The physical change is even more extraordinary. Breasts, thighs, hips, all have become normal and she has had her first monthly period. During the following weeks — and it is only a matter of weeks — the uterus, which was lacking, grows, and Susan becomes a completely developed woman — except for one thing. She will be interested in men and they in her, she may fall in love, she may marry. Only one thing is denied her. She can never have children for she has no ovaries.

"But if she should ever fail, at the proper time, to have one of those little, seventy-five-milligram pellets reimplanted in her thigh, all her feminine attributes would drop from her like Cinderella's borrowed finery and she would revert to the neuter thing she had been before, even to the disappearance

of the breasts. Yes, these Susans are the Cinderellas of endocrinology.

"What is in that magic pellet that can reverse sex so swiftly? Estrogen, one of the hormones of the female sex glands. Susan's own body, lacking ovaries, cannot supply it. But flooded with the female sex hormones contained in the tablet, she swiftly becomes a woman in everything except that she cannot bear children."

So the unpleasant youth and the attractive girl I had seen in the waiting room were one and the same person, another example of the way modern science puts the tall tales of ancient magic to shame.

We see in the case of Susan how a perverted mind can be restored to normalcy by supplying the missing sex hormones. But such perversion is only one of the mental aberrations that abnormally functioning sex glands may produce. There are the psychological disturbances of the menopause, afflicting men as well as women. There is involutional melancholia, the insanity that comes to both men and women in the fourth and fifth decades of life. One of the most interesting problems before the psychiatrists today is to what extent these mental aberrations are the result of changes in the sex glands. Has, for example, the diminishing quantity of sex hormones during middle age anything to do with the onset of involutional melancholia?

To answer this they have tried supplying the dwindling sex hormones to these patients. Does it cure their insanity?

Yes, says Dr. August Werner of the St. Louis University School of Medicine. He has injected theelin, one of the female sex hormones, into women, and testosterone, a male sex hormone, into men suffering with involutional melancholia, and the results have been what even a doctor calls "astounding." For all practical purposes, says Werner, this therapy is specific for this insanity.

No, says Dr. Cecil L. Wittson. Of twenty-three women with involutional melancholia treated with estrogen, he found that less than one third showed any improvement whatever.

*Perhaps*, say Dr. Charles Burlingame and Marjorie A. Darken

of the Neuropsychiatric Institute of Hartford, Connecticut. After a six-year trial they report that 58 per cent of women with involutinal melancholia psychoses, treated with estrogen, showed marked improvement, thus justifying this therapy in such cases.

*Yes and no*, say Dr. Herbert Ripley and Dr. George N. Papanicolaou of Cornell University Medical College and the New York Hospital.

"Probably a true psychosis is never cured by this treatment," they explain. "But lighter, nonpsychotic depressions may be greatly improved. It isn't that the diminishing amount of sex hormones produces the insanity, but rather that, in those individuals who are predisposed to this psychosis, it may be a precipitating cause. In the few cases where the decrease of sex hormones is a predominant factor in the illness, the patient can be relieved by supplying the missing hormones.

"This treatment is most valuable in relatively well-adjusted women who are going through the menopause. Unpleasant physical symptoms such as hot flushes, dizziness, pressure sensations, and tension may disappear and anxiety, depression, and irritability may be greatly alleviated."

So much for the sex glands and their influence on mind and personality.

What of the other glands? Seven of them, pouring some two dozen hormones into our systems?

We are, without doubt, the products of our internal chemistry. In this the hormones play a dominating role. To a very large extent they determine our character, our personality, our mentality, as surely as they determine our sex. When endocrinology was young and foolish, it was chiefly occupied with such considerations as these and in "typing" us according to our glandular make-up. But it overreached itself. Of course if we have magnificent adrenal glands, we shall almost surely possess terrific energy and high courage. Of course if we are equipped with a poor thyroid gland we shall be constantly tired, apathetic, disinclined to work, lacking in ambition. And so with all the other glands.

But — they oversimplified, the old-line endocrinologists. There are eight glands and they form an interlocking directorate, each so tempering and influencing all the others that it is impossible to estimate the part played by any one. In the beginning the endocrinologists attempted just this, even announced they would soon be making over undesirable personalities by transplanting glands, by cutting snippets off this gland and that, and by injecting hormones. Virility was promised to old men, youth to old women, mother love and feminine charm would be sold at the corner drugstore, the misbehavior of problem children quickly corrected, dull intellects brightened up.

They found it didn't work. They found that they were trying to play an instrument beyond their knowledge and skill. They found they couldn't make a Stradivarius out of a common fiddle. The infinitely subtle chemistry of the body defeated them.

It was because in its youth endocrinology fostered such dreams that it came close to being assigned to the limbo into which mesmerism, phrenology, and many another pseudoscience have disappeared. The endocrinologists were on their way out when along came Stockard, the man who presented them with their first measuring rod for the hormones and by that one contribution put endocrinology back into the fold of science. You will hear no talk of "pituitary dominant types," of rejuvenation, of the "glands of destiny," from the hardheaded, laboratory-minded, hormone-measuring men of today. They have learned their lesson. They are down to bedrock. But one thing they *will* admit they can do. They can take an idiot and . . .

It is 1917. A boy is brought to Dr. Allen — no famous specialist, just an ordinary small-town doctor. This boy, Tom Griffin, has of late become thoroughly incorrigible, plays truant, has joined a gang, committed thefts, and kept his whole family intimidated by his readiness to throw knives and lamps. Mentally he is greatly retarded.

Once there would have been nothing to do for such a boy.

Once a doctor would have said to the father, "A human being is born with such and such an intelligence, and nothing can raise it." He would have said, "Once a moron, always a moron. The insane sometimes become normal, the idiots never. The madman once had a mind, perhaps even a very brilliant one, but the idiot is mindless from birth. What has never existed cannot be restored."

Once a doctor could have said only this. But Dr. Allen, though he was only a small-town doctor, said none of these things. Instead, when his tests were finished, he said to the father, "I think I may be able to help your son. Even a year ago I could have offered no hope, but on Christmas Day, 1914, a man whom you probably never heard of, a chap named Kendall, made a most remarkable discovery. He isolated the active principle of the thyroid gland, obtaining thyroxin, and making available to us doctors, in 1916, certain small, colorless crystals containing 65 per cent iodine.

"That means that if what is lacking in the system is thyroxin, due to a defective thyroid gland, it can now be supplied — by injection. And that is just what is lacking in your son, Mr. Griffin. He has an abnormally small thyroid gland which supplies so little of this hormone that all his mental processes are slowed down and his intellectual development has been arrested."

So Dr. Allen gave Tom these thyroxin crystals — 65 per cent iodine. And in a very short time Tom began to develop intellectually. Soon he was normal. And thereupon, no longer suffering from feelings of inferiority, he dropped his bad companions, attended school regularly, and was a pleasure to have around the house.

But this is not the end of the story. Having grown to young manhood, Tom decided that he no longer needed thyroxin. So he stopped taking it — and a few months later he was in Dr. Allen's office in a worse state than his first. He had returned to his evil ways and had even served a short term in jail. Never, Dr. Allen knew, would Tom's own body be able to supply the amount of thyroxin necessary to keep him normal. He warned

him: "Tom, for the rest of your life, you'll have to take thyroxin as another man takes water, or else — ! And make very sure, my boy, that you're never cast away on a desert island!"

Tom is today a solid and successful citizen. No one has an inkling that, in order to remain a normal human being, he has to take regularly large doses of thyroxin.

The case of Tom Griffin is not one in a million. Everywhere today there are men and women who, but for thyroxin, would be sitting dull-eyed weaving rugs or baskets, babbling incoherently. A goodly number of people are going around today with nothing between them and idiocy but a shot of thyroxin. Only today it isn't the crystals extracted from the thyroid glands of cattle such as Kendall made, but a synthetic thyroxin every bit as good as the real thing. When infantilism or dullness can be traced to an insufficiency of thyroid and when the case is treated early enough, usually the mind can be brought up to its normal level of intelligence by the injection of thyroxin.

This the biochemists and endocrinologists have done.

But make a Stradivarius out of a cheap fiddle? Work out the chemical formula for genius? Create a Superman? No, that they cannot do. That they may never be able to do. To make a Superman out of an ordinary citizen will probably, for centuries to come, elude them.

There is one more angle of the physiological or organic approach to mental diseases which we should hear about — surgery. Has surgery made any contributions to the cure of diseased minds? Operations on the brain to destroy the lair of the enemy — what of them? We have heard much talk lately concerning the Surgery of the Intellect, the Surgery of the Emotions, as if the high priests of scalpel and burr could cut out of the human personality certain undesirable characteristics. Well, can they?

I had just left the operating theater of the hospital where Dr. Leo Davidoff, pupil of Dr. Harvey Cushing, had performed one of those brilliant brain operations for which he, too, is famous. We were sitting in Dr. Davidoff's office and I had asked him about a certain operation which claims to be a true Surgery of the Emotions. It is called "prefrontal lobotomy" and is

a very strange operation indeed. Holes are drilled in the skull, a knife about three inches long is inserted, and two fan-shaped sections, one up, one down, are cut in the brain through each hole. This slicing across the brain just back of the forehead severs the prefrontal convolutions (the latest addition to the brain) from the rest of the brain and this, it is argued, destroys the connections between the seat of self-consciousness and foresight and the seat of the primitive emotions, between logic and instinct. Ergo, the patient can no longer make the associations that induce his unhappy emotions. What of this procedure?

"This operation has gone beyond the experimental stage," said Dr. Davidoff. "I myself have performed it about a hundred times and find that it usually succeeds in stepping the patient up from one level to the next higher. About one third are transformed from noncontributing members of society to active workers. Another third are raised from institutional patients to those who can be taken care of at home. The remaining third, from being difficult institutional problems, become easy to handle. The operation does achieve a real transformation of the personality, beneficial to the patient as well as to those about him.

"*But* — with this operation there is always an accompanying loss. For example, a boy of sixteen who, as a sequel of sleeping sickness, had developed a psychopathic personality and was constantly in trouble with the law, was greatly improved in conduct by the operation. He now gives no trouble to anyone; but on the other hand he is lazy, disinterested, unambitious. He merely loafs around the house all day or goes to the movies. Very likely he has the same wayward desires as before but, the association centers of the frontal lobes having been separated from the thalamus, the seat of the emotions, there is no longer the same emotional drive back of these desires. Therefore he can now control himself. But neither is there a strong emotional drive back of his constructive desires.

"In cases of compulsive misbehavior I believe the operation is justified. But it is not for all types of psychoses. Take a paranoid patient. He believes that he is the object of far-flung persecu-

tions. 'Big interests,' 'powerful enemies,' ceaselessly plot his downfall. They will stick at nothing. He is constantly taking the most elaborate precautions against their machinations — furniture piled up against his door, traps set under his bed, soap in the keyhole, the radio cut off. And of course 'they' are always trying to poison his food.

"Before this operation he will not touch the poisoned food. After the operation he'll say, 'Certainly this food is poisoned. They'll never quit till they get me.' But he'll sit down and eat a hearty meal. That doesn't seem to me enough improvement.

"However, in the chronic malignant depressions, where the intelligence is unimpaired and the difficulty is chiefly emotional, the results are better. There ensues after the operation an apathy which is probably preferable to profound depression or excited agitation. In such cases this operation, since it is neither painful nor dangerous, is perhaps advisable. Any neurological surgeon can do it — it's a minor operation.

"Here again it is not the treatment of the abnormal mind that is the chief gain but our increased knowledge of the normal mind. This operation shows that in the frontal lobes take place the association and synthesis of the impressions received by the entire brain. It is that final synthesis that releases emotion. Make that synthesis impossible by cutting the connections between the frontal lobes and the rest of the brain, and emotion becomes far less vivid. That fact is decidedly worth knowing, both for the treatment of the sick mind and for the understanding of the sound mind.

"If I were to say what seems to me the greatest advance neurosurgery has recently made, it would not be such operations as this but the progress made in the location of the faculties. This is of the utmost importance in the study of mind and absolutely necessary if we are to operate on the brain intelligently. We *must* know in what part of the brain the various mental processes take place. Well, what has surgery done toward locating the faculties?

"Take the case of Claudia. Claudia was nine. She was brought to me because she had, for five years, had a queer little trick

of suddenly stopping whatever she was doing, staring into space and, with a contemptuous gesture downward, saying, 'Pooh, pooh to the devil!' Then raising her eyes heavenward and blowing a kiss from her fingers, she would whisper, 'And this to God!' Quite a touching little ceremony the first time she did it. The second time it was still rather sweet but as time went on it began to seem pretty silly and finally alarming. There was nothing else wrong with Claudia. Aside from this she was a normal and healthy child.

"But they told me that after this little scene she often felt extremely tired and that she had no recollection of having acted thus. Also, at the age of four, the time when these spells began, she had had a fall — nothing serious, only such a fall as any child might have.

"But I was suspicious.

"I took roentgenograms of her skull. And there, in the right cerebral hemisphere, was a large calcified mass. I operated, removed it, and Claudia's strange spells vanished completely.

"The explanation? The child had what we call psychic epileptic seizures. Usually epileptic seizures take the form of convulsions. But there are cases, such as this, where the lesion producing the seizure is located in a spot in the brain which sets off, not violent physical activity, but abnormal mental activity — a psychic seizure. It may be so slight a disturbance that no one notices it. It may be manifested merely in a momentary lapse of consciousness, a slowing up of the pace in walking, a brief absent-mindedness. Or it may be very violent, manifesting itself as an elaborate, automatic ritual or as a compulsion to commit a crime. It is such a psychic epileptic seizure that causes a woman to walk naked into the street or a man to kill his child. If the neurons affected by the injury happen to be those concerned in mental rather than motor processes, the fit will be of this psychic type rather than a convulsion.

"You see how, knowing the type of fit, then seeing where the injury is, we are enabled to locate the various functions of the brain. As Broca pointed out, by correlating the mental abnormality with the physical injury, we can track down one

faculty after the other. That's one way by which the study of abnormal minds leads to the understanding of normal minds. We can't lift the skull and pry into the brain of a normal person but we can with an abnormal person.

"The most thrilling demonstration I ever had of this took place in Breslau. An extraordinary man, Professor Foerster of Breslau. A lifetime is not long enough to study surgery, especially the subtle surgery of the brain. Yet this man never used a knife in his life until he was past fifty.

"Foerster was not a surgeon but a neurologist, interested primarily in epilepsy. A strange illness, epilepsy, for which there are all sorts of causes, all sorts of symptoms, all sorts of treatments. Most people, even some doctors, have the idea that most epileptics are abnormal mentally. Probably only 10 per cent of them are mental cases — and against this stands a small group who are distinctly above normal, some of them rating the classification of genius. Caesar had the falling sickness, Dostoevski, van Gogh, Petrarch, Mohammed, Peter the Great. The type of epilepsy which manifests itself in *grand mal* seizures (total unconsciousness) seems to lead to permanent brain damage; not to so great an extent the *petit mal* type. This was the baffling illness Foerster elected to study.

"I went to Breslau to study his technique and his method of determining the localization of the functions of the brain. It was bizarre, his method.

"Standing with him over one exposed brain after the other at the operating table, I have heard him say: —

"In some, not all types of epilepsy, there is a focal area in the brain from which the convulsion radiates. Now if we can locate this focal area, eh?"

"And he would bend over the naked brain and — you may find this difficult to believe — apply to it an electric current. Sometimes there was no reaction, sometimes a fit would ensue. It depended upon whether or not he had touched the spot from which the patient's convulsions radiated. He probed for it delicately with this electrical stimulation, moving it from spot to spot, always nearer to the point which, from observation

of the patient's fits, he suspected of being the focal area. When he touched it — bang, the patient went into convulsions.

“‘Ah,’ he would say. ‘Now we know where to operate.’

“And he would fall to and operate like a Superman, like one who has been cutting into gray matter all his life, disregarding all the traditional can'ts, mustn'ts, shouldn'ts, don'ts, of the profession. Opening the ventricles? He thought nothing of it. Removing the entire wall of the porus? He did not hesitate to cut and cut, even though it might mean the removal of the greater part of one hemisphere, until at last he found himself in normal brain. And that patient would recover and probably never have another fit.

“Throughout years of thus producing a fit when a certain point in the brain was electrically stimulated, he had located many areas whose functions he could definitely name.

“‘See,’ he would say, indicating a spot at the foot of the first frontal convolution, ‘here is the frontal *Adversivfeld*. I stimulate it and — look!’ At once there was a movement of head, eyes, and trunk to the contralateral side and tonicoclonic spasms of the extremities.

“‘If a patient is subject to convulsions of this type,’ he would say, ‘then we know the focus of his seizure must be just here.’

“He would stimulate a spot at the foot of the second frontal convolution, where lies the frontal eye field, and there would be a twitching of the eyes toward the contralateral side.

“‘If the patient's typical fit takes this form, we may be sure his trigger point is here.’

“‘So, by the type of fit to which a patient is subject,’ Foerster would conclude, ‘we can judge very closely, before he comes upon the operating table, where in his brain the trouble originates. We confirm our diagnosis by electrical stimulation, we operate, though we see no pathological condition of the brain cells, and — ’

“And, let me say it for Foerster, who was too modest to say it himself, a very high percentage of recoveries resulted. I saw and talked with many of these former epileptics myself.

“He had his explanation of this strange disease. ‘An epileptic

seizure is like the discharge of a gun,' he said to me. 'For that you must have three things — the gun, the bullet, and the pull on the trigger, *hein?* Very well. The gun, in an epileptic seizure, is the heredity which gives the readiness to convulse; for the bullet you have the injury to the focal area where the fit originates; and for the pull on the trigger you have the episode which touches it off — it may be only a drink of alcohol or a touch of constipation or a fright. Given all three, you have a convulsion.'

"The contribution to human happiness which this great brain surgeon made is the hundreds of people he cured or partially cured of epilepsy. The contribution he made to science is the immense progress he made in the localization of functions. It doesn't detract from his greatness that we have advanced beyond his method of locating brain lesions, with the electroencephalogram taking the place of electrical stimulation, and that today, except when the epilepsy is clearly due to gross brain scars, brain surgery has been superseded by chemotherapy.

"If sometime in the future we come to the point where all or most of our human faculties have been pretty definitely located in the brain, what then of 'the surgery of the intellect'? What will the surgeon eventually be able to do to help produce the Superman? By cutting out of the brain what is undesirable and crippling is the idea.

"Well, I am a brain surgeon. I know how much can be done with the knife to alter personalities, particularly in the case of tumors in the dominant frontal lobe. *But* — surgery is a destructive process. If you lop off a gangrenous limb you may prevent a man's dying, but you leave him a cripple. You have taken something away from him. He is no longer a whole man.

"So with the brain. The more we discover about the localization of functions, the clearer it becomes that the brain, emotionally and intellectually, acts as a whole. You can't locate intelligence. It is everywhere. You can't locate the emotions. They originate in the ductless glands as well as in the brain. So whatever you cut out, through dire necessity, you subtract something from the sum total of mind. When one frontal lobe is removed the patient seems to lose, none of the capacities he

already possesses, but he does lose, I believe, the ability to develop further. We can, surgeons and psychiatrists working together, eventually do great things for the sick mind, but I don't see how we can ever improve a mentality by operating on a healthy brain.

"Do you know where I, a surgeon, look for the next steps toward producing the Superman? To biochemistry. Body and brain are chemical formulas. It will be with chemicals, not knives, that, if ever, men will be made into Supermen."

After years of operating on brains, you can see that the surgeons should be getting somewhere in this matter of locating the faculties. And they are. Chiefly, so far, the areas definitely located, by any and all methods, are utilitarian, such as those which register heat, cold, pain; those controlling muscular movements; those concerned with sight, hearing, taste, smell, touch. They know, too, that through certain areas pass great association paths, and even though the boundaries of these areas are sometimes vague, the fact of the localization of the faculties has never been more firmly established than it is today.

There still remain vast silent areas in the brain of which we know little or nothing, chiefly in the frontal lobes, which respond to no sensation whatever. What is *their* function?

They are assumed to be the seat of the higher faculties — reason, memory, judgment, personality. In a word, the most valuable collection of matter on earth.

The major triumphs of late have, we see, been won by those who claim that whatever is wrong with the mind has its origin in something wrong with the body. Will this continue?

Or will the psychological schools again take the initiative and stage a come-back? Will there develop some new psychological technique, as revealing as hypnotism, as original as psychoanalysis? We don't know.

Meantime there are men who say, "Both sides are right. No mental disorder is exclusively physiological or exclusively psychological. The two work together, like gears enmeshing. To these illnesses *both* approaches must be made."

Let us question these middle-of-the-road men.

XV

*Parallel Lines Meet*

A MAN lies on a table in a semi-dark room. He is surrounded by doctors and attendants and is hitched up to some rather formidable-looking machinery — a radiometer placed near the ends of the fingers, a pneumograph attached around the chest, and tubes introduced through the nostrils into the stomach. These instruments record respectively temperature, respiration, and the functions of the stomach. In spite of this paraphernalia, our man appears comfortable, even cheery.

He is a well-groomed, sleek individual, this Leon Brisbane, one of those men who always look as if they had had a shower, a shave, and a cup of coffee all within the last half hour. And he is evidently quite used to this investigation of his internal processes and in no way disturbed by it. He smiles and converses jovially with the doctors until suddenly —

“What about your relations with your wife? Are you getting along any better with her — or are you still carrying on that affair with Carrie?” one of the doctors asks.

He flushes and frowns.

“Things are no better,” he says. “This is a terrible situation for me — a church worker, a man looked up to in my business and my community. I hate the whole situation and yet — what can I do? A man must have some emotional release, some pleasure, the love of some woman — and my wife . . . Well, no need of going into all that again. I’ve told it all to you before, and how I came to get into this mess with our maid. I’m

ashamed, I resolve every day to end the whole degrading affair, and then, well, you know how it is. . . .”

But the doctors press home the point. They seem, for doctors, peculiarly interested in the private life of their patient. They continue to question him. Does he really care for this girl, is there no hope of better relations with his wife, does he brood much over the affair? . . . And all the while they are watching those instruments and withdrawing specimens from the stomach. . . .

Another day — and another man lying on that table. Very different this forlorn and bedraggled outcast, this unwashed and unshaven derelict, from the successful stockbroker we saw lying here a few days ago. Any name will do — Bill, Abe, Tom — he is probably the only human being who knows it and he answers to anything. But he has his pride, as we shall see.

He, too, is attached to a whole battery of laboratory apparatus but it does not interfere with his freely expressed criticism of “the way this place is run.”

“Is something upsetting you today?” the doctors politely inquire.

“I hope to tell you something is upsetting me!” he fumes. “I guess you’d be upset, too, if it happened to you. Look! I come here and go through all this rigmarole of my own free will, don’t I? I don’t have to, see. Just trying to be nice. You ain’t helping my indigestion none. *I’m* helping science, see. So what happens to a guy who is trying to help you fellers out? That new feller on the door tells me I gotta go round to the public-clinic door, that’s what! Me, who’s doing you a favor! I’m no charity patient, see, and I’m not taking any cheek from no smart-aleck doorman! I told that so-and-so I’d be hanged if I’d use any free-patients’ entrance. I told him —”

As his rage increases the doctors draw off through the tube the contents of his stomach, watch the radiometer and pneumograph.

The next time our panhandler comes to the hospital, he flashes beneath the nose of that officious doorman a permit,

given him by the doctors, to use the visitors' entrance, and that day, lying on the table, he is at peace with the world. No complaints, no rage, no emotional upset.

And now what is the purpose of this strange experiment?

The doctors have long known that stomach disorders and emotional strains go hand in hand, but the thing had never been clinically proved. What, chemically, happens to us when an emotion grips us? If certain chemicals are released, which ones are they, how much, and what physiological effect do they have?

Well, said the research men, let's hitch a man up to a recording apparatus, arouse his emotions, draw off the chemicals, measure them, and compare the kind and amount to what is manufactured when he is in a normal emotional state.

So they did just that. Our stockbroker was the victim of duodenal ulcers, and our panhandler had chronic indigestion which never released him from its clutches except when, after a successful stretch of panhandling, he could take a few days off from "work." Both men were constantly emotionally upset. Was there any connection between their emotions and their illness?

They put them on the table, talked to them to excite their besetting emotions, anxiety in the one, anger in the other, and took the recordings of temperature, respiration, and stomach secretions. They found that, not only with these two men but with all whom they tested, the distressing emotions released an abnormal amount of free hydrochloric acid — and large quantities of free hydrochloric acid in the stomach will give anyone nervous indigestion. Anxiety, resentment, fear, irritability, a feeling of guilt, worry, anger, all produce excessive quantities of this corrosive acid as well as other bad reactions. Long continued, often repeated, these emotional debauches have a better than fifty-fifty chance of producing stomach ulcers.

Not all emotions are equally destructive. They found, these researchers, that there is a great difference in the amount of acid released by, for instance, anxiety and anger. When the stockbroker got to worrying about his marital affairs the free

acid in his stomach was doubled, but every time the doctors brought up the subject of the doorman with the panhandler, his hydrochloric acid tripled!

Thus again we see how mind and body are one, and how trouble starting at the psychological level can quickly become bodily illness. It is outmoded, the dualism fostered by the psychologists and physiologists, declare the middle-of-the-road men. To consider the mind as a distinct entity, as even so sound a psychologist as Wundt did, or on the other hand to insist, as did Kraepelin and, before him, Virchow, the father of cellular pathology, that in the cells of the body will be found the causes of all mental disorders, is to divide the indivisible. Even endocrinology, which at first appeared to prove that mental disorders are rooted in bodily dysfunctions, today proves quite the opposite, for it is clearly seen that most of the changes in the functions of the endocrines are primarily due to emotional factors.

Have you ever known a person with exophthalmic goiter? How does such a person look? Like an actor portraying the extremity of fear — eyes starting, pupils dilated, hands trembling, face strained. And how does such a person feel? Dreadfully nervous, anxious, and fearful. The two inevitably go hand in hand; overproduction of thyroid produces anxiety. And any doctor who served in the First World War will tell you that many a poor devil who had stood for months inactive in a trench, expecting the worst, had his thyroid gland completely destroyed by its own overactivity, fear having stirred up the hormones that riddled it.

Or take the heart. Before he died in that airplane crash, Banting (discoverer of insulin and its value in diabetes) sponsored a series of experiments to show the effect of the emotions on the heart. They tried scaring animals to death in his laboratory and found it was no trick at all. The fright caused angina pectoris and the angina pectoris caused death.

Then, just to prove they were right the first time, they took a second group of animals, severed the emotional fibers of the vagus, and tried to scare *them* to death. Couldn't be done.

Those operated animals were incapable of fear. Therefore couldn't get angina.

In the same manner high blood pressure may be due to emotional conflicts, and palpitation, a feeling of suffocation, blushing, and other similar reactions are common manifestations of the way in which the emotions affect the heart. The respiratory system is easily influenced by the emotions — a man in love may suddenly find himself without breath to speak, an attack of asthma may be precipitated by an emotional crisis.

Too long, say the middle-of-the-road men, have physicians regarded a human being as a bunch of organs put together to make a man. Man is more than the sum of all his parts — more, and entirely different from what any scientist, however brilliant, could have imagined he would be when added up. Something altogether unpredictable emerges from the combination, just as hydrogen and oxygen, joined in a certain way, give us the totally unexpected result of water. The organism-as-a-whole, which, for want of a better name, this particular combination of matter and mind must be labeled, is something infinitely superior to their addition. Man is not a mere aggregation of more or less detachable parts. He is more than a vehicle of a gastro-intestinal tract for one specialist to study, or of a brain or a nervous system or a series of glands for other specialists to probe into.

So when the question comes up: Does the brain make the mind — or does the mind make the brain? Does the organ determine the function — or does the function determine the organ? Is schizophrenia caused by a diseased organ — or by a diseased mind? the middle-of-the-road men answer: —

"These are purely academic questions, as futile as the questions the old churchmen used to ask themselves, such as, 'How many angels can stand on the point of a needle?' As soon as trouble starts on one level it immediately spills over into the other. It is a waste of time to discuss whether a man with stomach acidity should be given bicarbonate of soda or taught to control his emotions. We must do both. And so with those emotional disorders for which we have no established cure. We

should treat them both physiologically and psychologically."

Very well. Now who are some of these middle-of-the-road men and how, practically, do they proceed?

In 1910 a Swiss, Dr. Adolf Meyer, was appointed Director of the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital in Baltimore, and for thirty years continued to hold that eminent position.

He is the dean of American psychiatry yet no man could make less effort to be imposing. He still wears the crisp goatee of his early medical days, and it is still pepper-and-salt in spite of his eighty-one years. Pushing his chair back against the wall and tucking his toes beneath the rungs, he begins to tell you, in a clear, quiet voice, that this whole complicated business of psychiatry can be explained in very simple terms.

He is a man of large mind, but in the many spacious rooms of his mind there is not a single dark or locked chamber. Of all the things he knows (and there has scarcely been a movement in psychiatry during the past forty years in which he has not played an important part) there is nothing he cannot explain in simple, homespun phrases. "Rational," "common sense," "sensible," "plain," "simple," are words that keep recurring in his conversation — and his favorite is "common sense."

He has developed, in his fifty years of practising and preaching psychiatry, a science which he calls "psychobiology" and which he describes as a "common-sense" psychiatry. It is not a study of cut-and-dried mental diseases and their treatment. It is not a defining of terms, a splitting of psychological hairs, a delving into the unfathomable, a discussion of the pale abstractions of metaphysics, an affixing of Mediterranean words to so-called "disease entities," a dogmatic classification of mental illnesses. No. It is a method of approach to the study and treatment of human beings in difficulties. It admits, for this purpose, any and all methods of treatment that bring results. The insulin shock treatment and psychoanalysis. Dilantin and hypnotism. Surgery and psychotherapy.

From the beginning Adolf Meyer could see man in no way

but as a unit, a Body-Mind, never as a body which happened to be complicated by a mind or a mind which appeared to be hampered by a body. "We cannot divide human nature," he says. "Our souls have bodies and our bodies have souls." He found he could not apply the abstract principles of academic psychology to a flesh-and-blood human being without a considerable remainder — and that remainder contained almost all that made him a human being.

No avenue of approach to the human being in distress should be closed to the psychiatrist, he held. Every science concerned with man contributes something — anatomy, physiology, chemistry, psychology, pathology, sociology. Psychoanalysis as well as biochemistry is of value, but a psychoanalysis shorn of its more fantastic elements — a "common-sense" psychoanalysis. Its principles can help us to understand the abnormal mind, explain the meaning of the heretofore meaningless conduct and chatter of the insane. For the insane person is still, as Freud and Jung and Adler pointed out, thinking — true, not logically, as you and I flatter ourselves we invariably think, but nevertheless thinking. And it is possible, by investigating his unconscious, to understand this illogical thinking.

A woman no longer young, never good-looking, obviously poor, registers at a third-rate hotel, enters her room, and, though it is still morning, goes to bed. Then she telephones the office. When the Prince of Wales arrives, he is to be shown up at once.

When the asylum authorities arrive, she refuses to go with them, even to leave her bed. She is expecting the Prince of Wales who is to marry her that day.

This princess-to-be has lived all her life in the most squalid surroundings and possesses not a single grace of body or mind with which to attract any man. Naturally the Prince of Wales has never heard of her. None of the preliminaries of a wedding are afoot. There is no trousseau, no minister, no plans for a honeymoon, no license even. But none of these facts for a moment shake her conviction that she will that day become the wife of the Prince of Wales, heir to the English throne.

A very common type of schizophrenia. Her thinking is, to us, sheer nonsense. What she implicitly believes in is beyond the bounds of possibility, yet she sees in it no contradiction to reality.

On any other subject this woman is quite reasonable. She meets the sordid conditions of her life with a sufficient grasp of reality. She works on weekdays and plays on Sundays. Her thinking is disturbed in only this one direction. And even here it is not without a kind of logic, for by this delusion, in one bound, she overcomes all her handicaps and achieves everything she desires. She is *living* a fairy tale.

Is this so hard to understand? Is it so alien to our own thinking that we can swear by heaven there is nothing in common between us and such a one? In our childhood we have often lived, for a time, such fairy tales. As adults our illusion of ourselves is so different from reality that no one would recognize us by it. When we are alone, we take it out and hug it, this illusion. We are rich, charming, witty, brilliant, admired, gifted with those very qualities we notoriously lack. Like the schizophrenic, we are still thinking, but thinking *interiorly*, without relation to external facts.

Or again, take the case of a woman patient of whom Bleuler, the famous Swiss psychiatrist, tells us. Ask her her name and, "I am Switzerland," she replies. Pure nonsense. But question her further, analyze her thinking. She is confined in an asylum, deprived of liberty. Switzerland is a republic, a free country. To be free it is necessary only to be Switzerland. Anyone may have the thought. It is only when we sacrifice reality to the illusion that they put us behind asylum doors.

Or another time this same patient will say, "I am the Cranes of Ibycus." One must be well up in one's Schiller to understand her now, but when one does, again one must admit that she is by no means as crazy as at first appears. In his poem entitled "The Cranes of Ibycus," Schiller says: —

Kept free from guilt and failings,  
And pure her childlike soul.

Thus does psychoanalysis, the study of the unconscious mind, help the psychiatrist to understand the ravings of those who have forsaken reality to live in illusion. Herein, says Meyer, is its value. The unconscious of Freud exists, certainly, but we need not be too greatly concerned with it. In treatment we can remain largely on the more accessible ground of the conscious, the overt life of the patient.

What we *must* be concerned with, the whole object of our concern, is—a *personality*. Not a bundle of organs, not a disease, not a body or a mind to be analyzed, dissected, diagnosed, pigeonholed. Not a medical mystery to be studied first in a laboratory and later in a dead house in order to satisfy our curiosity as scientists. No, none of these things, but a personality—a human being in distress. A father whose children need him. A son whose mother grieves for him. A man or woman who has failed to solve the problems of life and who needs help.

A mental disease, continues Meyer, should be regarded as “the maladjustment of a *whole personality*, rather than merely a brain disease in the purely physiological sense. We know today that some disorders can be explained, and treated, as abnormal and unhealthy ways of the person rather than as disorders of any special organ; rather as disorders of the *combination* and its behavior.” What we must do then is to help this human being to rebuild a personality which has failed in a life adjustment.

How?

First we must make a life chart of the patient, says Meyer. This chart records his life before he became ill, his character, his problems, his emotional reactions in the setting of his life history. It takes into consideration all the physical and organic factors such as childhood diseases and habits; all emotional factors such as childhood repressions, sexual instincts, frustrations, his relations to others, his habits of work, of sleeping, of eating. It includes the chief events of his life and his changing attitudes toward society. It includes what is normal, less normal, and positively damaging. It is concrete, objec-

tive, "common-sense." It gives us *facts*. It is understandable.

"In this life chart anything, mental or physical, is of importance if it makes a difference. Anything can be used as a fact the presence or absence of which makes a difference — that is, if it helps to explain under what conditions the delusion or hallucination occurs."

On the basis of this life chart we go to work. We begin to re-educate our patient.

He is given a program of work and play, diet and treatment. He is taught occupations that are useful and, to him, interesting — weaving, woodcarving, bookbinding, carpentry, basket making, sculpture. He has frequent sessions with a psychiatrist who endeavors, by psychotherapy and mutual understanding, to arouse in him those dormant instincts and emotions which would revitalize him. He is forced to lead a fairly normal life. He is drawn out of himself. He is no longer a number on a back hall. He is Alvin Tompkins, captain of the hospital football team.

Such a program was, when Meyer went to Johns Hopkins in 1910, the basis of his treatment — "activity" therapy, as he calls it, or "therapy of the person." To it, as the years rolled by, he added everything of value that was contributed from any field, but these two principles, activity and understanding, still remain the backlogs of his treatment.

"Occupational therapy uses the whole person," he will tell you, "body and mind. It is therefore more psychobiological than an induced fit. It is more *normal* than psychoanalysis, which accents the abnormal. Work is no new theory, needing a lot of explaining and understanding, as psychoanalysis is. It is a thing natural and normal to man. It is better to get these abnormal minds to accept a normal way of living than to focus them on some perversion. It is better to put the accent on health than on sickness. We should try to give these people something to do that they *can* do and so give them a rest from the things that don't work well for them. Thus we can reorient unhealthy minds to what is healthy."

Today, of course, this idea of occupational therapy isn't news,

not even to the least informed of us. We are at least abreast of 1910 in psychiatric matters. But at that time it *was* news.

If you have read Clifford Beers's story of his incarceration in various asylums at the turn of the century with its plea to end the systematic abuse of the insane (locking excited patients into padded cells, knocking them down with wet towels or bare fists, pumping narcotics into them, strapping them to beds, binding them in sheets, putting them into strait jackets) and realize that freedom from brutality was all he was asking for, you will understand that such a program as Meyer's was, in that day, revolutionary.

For what he proposed to do was to turn these patients — yes, the most violent of them — loose. And then to re-educate them.

William A. White used to tell of conducting, not many years ago, the superintendents of large and reputable mental hospitals in this country through his own St. Elizabeth's in Washington — ward after ward of well-behaved people, working, playing, leading normal lives.

"Very nice, very nice indeed," said the superintendents. "Now show us the back wards where you keep the violent patients."

And told that they had already seen them they were not surprised — they were frankly incredulous.

The question in those days was what, when you released these violent patients, you were going to do when they started smashing the furniture and assaulting the attendants.

It was amazing. You didn't have to do anything — most of the time. Because they didn't get violent when they were free if they had work to do.

That was what Meyer discovered as he began to put his program into effect. For he found that this common-sense program of his, aimed at helping the patient to rebuild a personality which had failed in a life adaptation, was something the patient himself could grasp and with which he could co-operate.

The results he got were inspiring. More patients improved and were able to lead fairly normal lives either within or outside the institution than under any previous treatment. Today,

with the windows of psychobiology thrown open to all the winds of science, even more of these mental patients are being adjusted to life. The principles Meyer enunciated are the foundation of treatment in many, if not most, of the progressive mental hospitals of the country. Most of the treatments we have been discussing are too new, too experimental, too expensive to be employed to any large extent in the majority of mental hospitals. So occupational therapy and psychotherapy, the two pillars of Meyer's program, are the basic treatments in most institutions today.

We come now to another middle-of-the-road treatment. It is called the Total Push. It's sponsor admits it isn't total and isn't a push. It's just a slogan.

Its author is certainly not a middle-of-the-road man. All his life he has ranged himself uncompromisingly on the side of the physiological men; he has been their very eloquent spokesman, their Number One berater of the pish-tosh of psychoanalysis and the futility of psychotherapy. We have already met him and have heard him say, "Psychotherapy is a dismal failure. More is accomplished by a few drugs, shocks, and such measures, however crude, than by all the refinements of psychotherapeutics." Yes, it is Abraham Myerson, leader of the ultra-skeptical group of Boston, who has given us a second middle-of-the-road treatment.

What has such a deliberate partisan to do with mealy-mouthed compromise, with pussyfooting middle-of-the-road measures?

This: that he is so thoroughgoing a skeptic that he doesn't fully believe in the things he believes in more than anything else. Psychotherapy may be a sheer waste of medical breath, but what have the physiological treatments accomplished to date? They're on the right track of course, but they haven't yet arrived. Meanwhile —

Meanwhile there are those lifers on the back halls. We can't cure them. We don't expect to. But can nothing be done to ameliorate the lot of these chronic cases, schizophrenics of long standing, violent, wretched, doomed, leading a worse than

animal existence? Can nothing be done to halt their deterioration?

This, obviously, is their position: They have withdrawn from life. They exist in a little world of their own making. Society has accepted their withdrawal. More, it has suspended in their case the laws according to which the rest of the community lives. The insane man is held responsible for nothing — not for his crimes, not even for his own safety. If he refuses to eat he will be fed. If he refuses to dress, he will be dressed or allowed to lie in bed all day. If he destroys his clothes he will be given others. If he attempts suicide he will be rescued. All law, all responsibility, have been suspended for him.

Is it to be expected that these people will take the initiative to return to harsh reality? Is it reasonable to suppose that they will spontaneously make an about-face and begin to travel in the opposite direction, take the difficult road that means the reassumption of a binding sense of duty?

A child, even a very young child, out in the world, has more sense of responsibility than these people. When an English refugee ship was torpedoed in midocean, three hundred out of the four hundred women and children being evacuated from England were killed. How, in this crisis, did the children stand up?

"I got my two children, Sonia and Derek, onto a raft," said one mother. "Twice during the nineteen hours we drifted Sonia was washed off. We pulled her back. Finally I gave up all hope. I said, 'Darling, I think we'll take off our life belts and go to sleep in the water.'"

"But Sonia said, 'Oh, no, Mummy. Don't do that yet. I'm sure we'll be picked up.'"

A ten-year-old boy helped man a lifeboat with the dead and dying all about him. One of the nurses, dying, begged for someone to hold up her head, and the boy, cradling her head in his arms, said, "I see boats, nurse. It won't be long now. Everything is going to be all right."

A thirteen-year-old girl, comforting a nurse, said, "Don't worry, nurse. The British navy will never let us down."

It was the sense of responsibility to others of these children that helped to keep up the courage of the hundred who were finally rescued.

"They were wonderful. They carried out every order. They were as brave as the bravest adults."

It is this sense of responsibility that those patients in asylums have lost — and been deprived of.

"For we, too, are guilty," says Myerson. "When they come to us they have already retreated very far from the responsibilities of life. But we permit them to retreat still further. The new patient in a hospital feels that everyone is against him. He withdraws more and more into himself, talks less and less, finally becomes entirely passive. On top of his original psychosis he acquires a prison psychosis. Some even escape into that state of waxlike flexibility reached by the catatonic who will remain for hours in whatever attitude we place him. Further than that he cannot retreat.

"We allow the psychotic to exist in a vacuum with no motivation, no obligation, no responsibility. He is never praised or blamed, never rewarded or punished, never required to attempt anything, to succeed or fail. And we expect *him* to change all this?"

In 1938 Dr. Myerson started his Total Push at the Boston State Hospital. He took thirty-three long-time patients, admittedly incurable, old residents of the back halls. His plan was to surround them on all sides — and push. Push them along the road that led back to normalcy. Push them physiologically and psychologically — that is, *totally*.

He gave them hydrotherapy in every form, from cold streams of water from a hose played on the body to prolonged baths.

He gave them physiotherapy — massage, rubdowns, sunshine, lamp treatments.

He gave them exercise and games.

He gave them enriched diets, with special attention to the vitamins. All this to build up their bodies.

Then he started the psychological push. These men and women, who for so long had lived entirely within themselves,

were to be forced to assume once more certain fundamental social obligations. They had been allowed to live, eat, sleep in their own rooms. Now there was to be "a general shift from the tray in the back room to the aestheticism, companionship, and sociability of the dining room." There was to be, instead of dressing gown and bedroom slippers, regular dressing, even "dressing up," so that the patient would be pleasing to himself and others. Hair, nails, beards, complexions, were to be scrupulously cared for.

Ejected at regular hours from their rooms, they were to be forced to work and play and associate with others, and there was to be systematic praise and blame, reward and punishment, in the presence of other patients. Candy, ice cream, cigarettes, would be given for good behavior and withdrawn for bad behavior.

This was Myerson's plan.

"It is not assumed, claimed, or believed that this is a cure for schizophrenia," says the skeptic, never so skeptical as of his own ideas, "the contrary being the assumption. Nevertheless —" Nevertheless there was John L., age thirty-eight, a graduate of the U. S. Naval Academy, and a schizophrenic of twelve years' standing. Disheveled, irritable, profane, unco-operative, violent, confined to a disturbed hall, and refusing to take part in any sort of diversion, entertainment, occupation, or exercise — that had been John L.'s life for twelve years.

Then one day he was escorted to the gymnasium and a ball was thrown to him. He paid no attention. They kept on throwing it. Every day. One day he caught it. The next day he caught it and threw it back. Next thing he knew he was playing on a ball team.

Then: calisthenics, badminton, bowling, billiards. He was good — and he knew it. Began to show off to his fellow patients. Got to know them. Started to play cards with them. Soon took to chatting with them — without curses. In a short time he was greeting everyone with a smile, became responsive, friendly, cheery. Naturally his new social position imposed certain obligations. He began to dress up, developed quite a peacock

strain, feeling himself, as billiard champion, the cynosure of all eyes.

These activities, plus his medical baths, ultraviolet treatments, and high vitamin diet, all of which greatly improved his health, added up to quite a program. He was a busy man, John L., working hard seven hours a day.

In three months he developed "full and active contact with reality" — which is the psychiatrist's way of telling us that from being a deteriorated and degraded creature in a back room he became a fairly normal and happy human being.

He was not cured. Myerson would be the last man to admit, even if John L. were sometime able to go back into the navy, that he was cured. But was he or wasn't he a better and a happier man than he had been for the past twelve years?

Such patients — and John L. is typical of the group — Myerson calls "convalescent." Total Push is not a "cure." It is a method of amelioration. Myerson himself points out that there is nothing original about it. Everything he does has been done before, but never so intensively, never in just this combination. It is another compromise between the two methods of approach to mental disorders — and, as you see, it brings results, even sometimes with the most hopeless cases. In one variation or another it is being used in some Veterans' Hospitals.

Few men can remain perfectly balanced on the fence between the physiological and the psychological theories, never leaning to one side or the other, and most, however honest and determined in their endeavor to be true middle-of-the-road men, list heavily to port or starboard.

Dr. Winfred Overholser, superintendent of St. Elizabeth's in Washington, D. C., is, because of his list toward psychotherapeutics, the natural successor to that champion of psychoanalysis, Dr. William Alanson White. Overholser believes that although all psychiatric thinking today utilizes psychoanalytic concepts, formal psychoanalysis is of little value as a treatment in the psychoses. He holds that it is invaluable in understanding the abnormal mind but only indirectly useful in treating it.

On the other hand — and we cite Dr. Overholser because the

place where he comes to rest between the two extremes is common to a number of men — he does not hold with the shocks and other radical physiological treatments. "The insulin shock? We gave it a trial for two years and have dropped it. Metrazol? Equally ineffectual. The electric convulsive shock? More hopeful. Depressions do yield to it, not schizophrenia. Freezing? It never went beyond the experimental stage. Estrogen for involutional melancholia? Disappointing. Psychoanalysis? Of little use as a treatment for psychotics."

What then?

The simpler, less experimental, less spectacular therapies — occupational, hydro-, electro-, physio-, psycho- — the backlogs of every institution. And in a treatment, which we'll hear about later in connection with the war neuroses, called narcosynthesis. It's been in use about a dozen years at St. Elizabeth's and is, says Overholser, "a very useful shortcut in psychotherapy."

"I am not a psychobiologist, no," says Overholser. "I am not a psychoanalyst, no. I am a middle-of-the-road man with a list toward the psychological approach. I believe in influencing the sick mind through psychotherapy — in that more than in such drastic physiological measures as the shock treatments. We can't disregard the mental factors in physical illness, nor vice versa. We are not dealing with a mind *or* a body, but with an organism which reacts to a situation in various ways."

I should say that of all the middle-of-the-road psychiatrists, none is so accomplished a tightrope walker as our next man. Myerson lists heavily toward the physiological approach, Overholser toward the psychological, but *this* man balances perfectly between them.

In 1918 a young fellow with taffy-colored hair came home from the wars. He was resplendently decorated, he was a premature medical colonel, he had done some rather satisfactory things. Before the war he had held only a subordinate job in a state hospital.

But some people aren't born with subordinate dispositions. In four years our young man was superintendent of the hospital. He was so young that, in order to look convincing, even prob-

able, in his new role, he had to cultivate taffy-colored sideburns.

Behind his hospital walls, he kept hearing of the great things that were happening outside. Psychiatry, out in the world, was making tremendous strides — but not in his hospital. “Incurables” were being cured in other institutions — but not in his asylum.

He did what he could. He appeared before boards and he harangued directors’ meetings. He pleaded for funds and he described with considerable oratory the miracles of modern science. It was no go. State hospitals have no money for “experiments.”

He left the state hospital. He went into private practice. He thought he was getting away from his problem. He found he was confronted with it as never before. For many of his patients indubitably needed hospitalization and, comb the countryside as he would, he could find no institution which corresponded to his ideas of what a mental hospital should be.

He was by now becoming a little famous. He became the moving spirit in building the Medical Center in New York and was gradually getting to be known as an outstanding consultant on the planning of hospitals. So he began looking about for a place where he could do some of the things he was determined he would do. In Hartford, Connecticut, he found an old asylum on thirty wild acres. There were a number of dilapidated buildings, with pale ghosts flitting through the back halls, receiving no treatment, no attention even, from the overworked, case-hardened “keepers.” There was no money, no equipment — “oh, yes, this way, doc, here are a couple of bowling alleys. Use ’em as a storehouse for farm implements now.” And from a dusty corner the attendant kicked out two baseballs. “Some of the nuts used to have a catch now and then. But they got too frisky with these.”

It was as bad as the asylum in which he had originally worked. But it could be entirely his own to do with as he would.

And soon it was. He became Psychiatrist-in-Chief of the Hartford Retreat, one of our oldest and, at times, one of our worst “lunatic asylums.” He had done a lot of shouting (he was a

very brash and vocal young man) about all the things he would do if the state would only untie him — yes, even without funds. So now he had to show them. What, with such an institution as he had acquired, could he do with his bare hands?

In a few years he had shown them.

The Hartford Retreat is today the Institute of Living and the taffy-haired young man who took it over is Dr. C. Charles Burlingame, no longer needing those taffy-colored sideburns to look impressive.

Let us sit with him a while in his office — not much like an office, more like a library, with sunshine pouring in, open fire, books everywhere, dogs almost everywhere, pictures, deep chairs and couches — in a big building not erected at a happy period of American architecture (probably mid-Rutherford B. Hayes) but made somehow attractive by its old ivy and sunlight-yellow paint.

We want to hear about the Institute of Living because what has been done here is indicative of what has been going on all over the world during the past few decades. The insane are no longer regarded as moral lepers to be put away and guarded, but sick people to be cared for and made well; the place where they live is no longer an asylum but a mental hospital.

"We work here on the principle that mind and body are an indivisible unit," says Dr. Burlingame. "Every day this is being demonstrated in some new way, so that not the least informed can any longer doubt it. Take those experiments showing the influence of the emotions on the gastric juices. Take the cures of cretinism with thyroxin. Take Banting's experiments in producing angina in dogs. Take — something the public is well acquainted with — the lie detector. Say a man is lying, a psychological phenomenon. The machine detects it — how? By registering the tensions, the changes in rate of breathing, blood circulation, and the profuse perspiration which he cannot control, clever and accustomed liar though he be. The body is involved in every mental process, the mind in every bodily process. If the two are ever separated there is not much the psychiatrist can do — because the patient is dead.

"There is no such thing as mental disease. There is only disease, with the symptoms predominantly mental or physical. In tuberculosis they are predominantly physical, in dementia praecox, predominantly mental.

"Wherever dementia praecox originates, whether on the psychological or the physiological level, it does look as though intense inner conflicts and the weakening of instinctive drives (sex, aggressiveness, and so on) at least contributed heavily to the breakdown. Difficult life situations with their emotional stresses certainly seem to play a large part in these illnesses.

"Take the way two men face war. I recall the case of one man at the front who was hysterically blind. One day he poured out this tale. His regiment was attacking. He came to a trench, saw several wounded Germans lying there. He leapt in, bayonet fixed, ready to finish them. They pleaded with him. He killed them. But never would he forget the pitiful expressions on their faces, their cries, the spurt of blood, the writhing. "Oh, God, I am a murderer!" he moaned.

"That is the type of mind that breaks beneath strain. To be a good soldier a man must kill without personal hatred and without remorse, as soldiers have always done, as the men of the R.A.F. did in the Second World War.

"And now take the other type of mind."

Dr. Burlingame goes to a shelf, pulls out a book.

"*From a Surgeon's Journal, 1915-1918*," he reads off the back. "Read this, written while the author was on a salient in Flanders."

I take the book and read.

And before long there's a bang, and black earth is thrown up like a geyser two hundred yards away and another one nearer. And the savage in you makes you adore it with its squalor and wastefulness and danger and strife and glorious noise. You feel that after all this is what men were intended for rather than to sit in easy chairs with a cigarette and whiskey, the evening paper or the best seller, and to pretend that such a veneer means civilization and that there is no barbarian behind your starched and studded shirt front.

I look at the back. Dr. Harvey Cushing, our foremost American brain surgeon.

"You can't imagine a mind like Cushing's ever giving way," says Dr. Burlingame. "One day, just as he was entering the operating room, he heard that his son had just been killed in an automobile accident. He proceeded with the operation as scheduled.

"There are the tender minds that break beneath unusual strain and the tough ones that don't. It is the tender minds that wind up in mental hospitals. So we must treat our patients psychologically as well as physiologically. Here at the Institute you will find, I think, practically every approved type of treatment, and many that are still experimental. Here at the Institute —"

Walk with us through the grounds. If you were not told otherwise — yes, even if you were — you would think this was a college campus, one of the older, more gracious ones. Boys and girls in sports clothes dashing around with books or tennis rackets under their arms. A nine-hole golf course dotted with players. A long, low building from which issues a great racket — the bowling teams in operation. An open door through which we glimpse a basketball game. A clubhouse where tea is being served, "dates" kept, cards played. An outdoor theater where a pageant is in rehearsal. A social hall where movies, concerts, plays are given. A sprawling hothouse where miniature gardens are being laid out. Finally, skirting a group of trees and shrubs, we emerge upon a huge outdoor swimming pool with gay parasols, tables, and chairs, where long drinks are being served and a diving exhibition is in progress.

Nowhere on our tour have we seen walls, bars, gates, chains, guards, uniforms. Is this an asylum? Or is it a country club?

True, we haven't been indoors . . . Well, suppose we go indoors.

We enter a large, sunny room where, since it is obviously a classroom and we are intruders, we slip into a back seat. Above the rows and rows of seats rise rows and rows of heads, mostly young heads. There is only one unusual thing about the ap-

pearance of this classroom — here and there one catches sight of a nurse's white cap.

Up front are a platform, a blackboard, and a professor. He is conducting a class in current events and though he has several assistants in his department he is a much overworked man. Current events is a popular course.

Is this the *inside* of an asylum? . . . Yes, of what was once an asylum but is now an Institute of Living. A school of education and re-education for those who had ceased to learn, had even begun to unlearn. This, in a word, is what has happened, in Dr. Burlingame's relentlessly logical mind, to the idea of occupational therapy.

"Consider," says Burlingame, "the state of mind of, say, a successful lawyer who goes to a mental hospital and is told that he will now learn to weave baskets. He has probably contributed regularly to a charity for teaching the blind or the feeble-minded to weave baskets. Naturally he will feel that he has fallen pretty low in the intellectual scale if he has come to this. Is that going to help his morale and put him on the road to recovery?"

"It isn't only the illiterate who have breakdowns. It is men and women of high intellectual attainments, important figures in the world — judges, bankers, professors, priests. When they become mentally ill, they haven't lost their wits. They are, frequently, just as intelligent as ever. Show such a man a carpenter shop or a bookbindery, and he'll say, 'Very nice. Very nice indeed. But not for me.' What you *must* do if you are to accomplish anything is to arouse his interest, and he will never in this world or the next be interested in rug weaving, brush making, bookbinding, metal work, carpentry, or even the graphic and plastic arts. He *loathes* the graphic and plastic arts.

"But suppose you present to such a man the opportunity to do something he has always longed to do — to increase his knowledge of world affairs, to play a musical instrument, to become a public speaker, to acquire a knowledge of law, to speak a foreign language, or to learn something that would

make him more valuable in his business. Wouldn't you be more likely to get his interest and co-operation?

"The basis of our plan for re-education is the idea of a Balanced Life. Every mentally ill person, whether in the early stages of a nervous breakdown or the final stages of a psychosis, has ceased to lead a Balanced Life, and many normal people are heading for trouble because they, too, are leading unbalanced lives.

"One of the popular expressions for a mentally ill person is 'unbalanced.' But unbalanced how? Intellectually? Sometimes. But *emotionally* always. It is not so much reason that is dethroned as it is emotion that has run amuck. We should not speak of such a condition as 'insanity' but as 'emotional imbalance.' The unhappy and destructive emotions — fear, anxiety, indecision, sexual tensions, boredom, jealousy, a sense of guilt, an inferiority complex, oversensitiveness — have attained the ascendancy, and the healthy, happy emotions — courage, self-confidence, optimism, ambition — have been crushed.

"The emotions can be brought again into balance through a life of balanced activities. Most people lead one-sided lives — all business or all pleasure or all physical. Man is a many-sided animal and when only one or two sides of his nature are satisfied he becomes emotionally crippled.

"What is meant by a Balanced Life? There are four things in life without which a man or woman is incomplete — work, an avocation, social activities, and physical exercise. All four must be taken care of in a Balanced Life, whether out in the world or in an institution. The people here have been limping along on three, two, or even one leg. Many haven't even one leg to stand on. We endeavor to give them four legs."

Four legs. First, work. The Institute offers courses, often college equivalents, in every sort of subject. It may be advertising, insurance, business, law, investments. It may be stenography or bookkeeping or office management. It may be cooking or dressmaking or gardening. It may be French or Spanish — anything which a staff of some fifty college professors and instructors is prepared to teach.

Second, an avocation — which is to say a hobby raised to a passion. As a counterbalance to work there must be pleasure. This avocation may be photography or painting or even — there *are* people like that — jurisprudence. It may be the most usual or the most unheard-of occupation. Here they help you discover your avocation and develop it.

Exercise and sports are the third leg, for there are few sound minds in unsound bodies. So there is skiing for those who love danger on the high slopes, calisthenics for those who enjoy grunting beneath heavy weights, riding, badminton, squash, anything you choose to name — and as much expert instruction as though one were planning to be a champion.

The fourth leg is social activities, for man is a social animal. Nothing more marks the unbalanced mind than withdrawal from social contacts. Therefore, parties of all kinds, dances, bridge games, plays, concerts, are a part of everyone's program, and if you can't dance, play bridge, act, or perform on a musical instrument, they'll see that you soon can.

All four sides of human nature are, by this four-point program, steadily developed, until the patients, no matter how ill, soon find themselves unconsciously living more normal lives and thereby becoming more normal human beings. Anyone out in the world who finds himself getting into a rut, becoming tired, peevish, nervous, could do no better than to adapt to his own uses this plan for a Balanced Life and thus probably save himself from a nervous breakdown.

This design for living is the psychotherapeutic side of the treatment at the Institute. Back of it, on the physiotherapeutic level, are all the resources of a complete modern hospital plus research laboratories, treatment rooms, operating and examination rooms. A patient could no more conceal a germ or an inferiority complex in these laboratories than the glass lady at the Museum of Science could conceal her spinal column.

Not only are all the established physiological treatments provided, but likewise the most advanced. All the shock treatments are given when indicated as well as electric fevering for paresis. Original research has been done on allergies, hormones, vita-

mins, and special studies in allergies and endocrinology as affecting mental and nervous disorders. In the new field of electroencephalography the Institute is far advanced.

This "educational therapy," or re-education, carried out on both levels, is a quite different thing from the Total Push, involving as it does not alone pushing the individual into certain activities, but also a thoroughly normal, unhospital-like environment and an elaborate program of re-education covering all sides of his personality.

And this — in less than ten years — is what the young man with the taffy-colored hair built with his bare hands, starting with two bowling alleys with fallen arches and two baseballs with their vitals pouring out.

With this all-out effort recovery rates are naturally high. Including all types of patients, from those with a mere feather of a neurosis up through the schizophrenics, the Institute sends home, either as recovered or as greatly improved, from 60 to 85 per cent of its patients, and only 2 to 3 per cent of these return.

At the Institute no form of shock treatment is given without re-education to supplement it. At the first moment of contact, a small, modest schedule is started, just playing ball perhaps, and as the mind gradually opens, more is added — a little work, a little play, a little exercise — until at last a full program of many interests is being carried. Above all, in all his contacts the patient must be made to feel that he is living in a normal environment, and here, says Dr. Burlingame, it is the little things that count.

"Every social contact must be handled exactly as it is in the outside world," he insists. "If you treat these people as though they were unusual, cut off from society, how can you expect them to react normally? Take the matter of entertainment. How is it handled in society? Does someone go about shouting, 'Entertainment tonight! Entertainment tonight!?' Certainly not. So, as in society, we announce all social affairs in a weekly magazine, just as it is done in the *New Yorker*. Or we send out invitations.

"And is it a good idea to show animal pictures exclusively —

so as not to excite the patients? If they can accept such films and like them, then I say they are completely de-socialized, and the institution where this is done hasn't advanced beyond being a dressed-up insane asylum. Here we make a point of showing only previews. A little thing, but it builds up morale. Our audiences know that they are a jump ahead of Broadway.

"The same with the library and bookshop. Is reading books that are discards, out-of-date, and antiseptic the way to regain contact with reality? I think not. So we make an effort to have all the worth-while books *before* publication. Often and often you will hear a relative say to a patient, 'Good heavens, I've been trying for weeks to get that book from our library!' Do you think the patient doesn't get a kick out of that?

"Another thing. Patients should not be lined up like prisoners in a state penitentiary for the barbershop with an attendant bawling, 'Next! Next!' as they march like a chain gang to the chair. Each person here makes an appointment for the barbershop or beauty salon just as he or she would at home.

"These are small things. Multiply these small things ten thousand times and you'll get an idea of the impact they can have. It makes all the difference between an insane asylum and a home. We insist that everything the patients see or hear, even to the tone of voice of every employee, be a constant reminder of reality and normal living. Don't think that even those furthest removed from reality don't understand the tone of a voice."

I have seen Dr. Burlingame among these very sick patients, those who live in the "disturbed" cottages and wards. I saw one disheveled woman approach him and say, "I want to go out. Tell the nurse I can go out. If *you* tell her she'll take me. *You* take me out for a walk."

"What, with a coiffure like that!" exclaimed Dr. Burlingame, as any man might to any woman whose hair-do he disapproved. She moved away, patting her hair, evidently giving it some thought.

To another woman, wandering by herself, monotonously repeating, "These are not my people. I don't know these people.

My people are outside," he called a cheery "Good morning."

"Good morning, Dr. Thomas," she said, coming closer to us.

"I had a chat with your brother at the La Guardia Airport last night," continued Dr. Burlingame.

Her eyes lighted.

"Yes, my brother. . . . Oh, you're Dr. Burlingame, aren't you?"

Multiply these small things ten thousand times. . . .

Since only a small per cent of mental and nervous disorders have to date been *proved* to be of physiological origin, since even a smaller per cent have been shown to be of psychological origin, a combination of the two methods of treatment seems to many psychiatrists to be the rational and practical procedure, and such reasonable and sensible practitioners as these middle-of-the-road men have shown the way.

And now, in our next chapter, suppose we consider *ourselves*, the great mass of normal people out in the world who, because there is nothing overtly wrong with us, still boast our liberty. We believe ourselves normal, our friends concede that we are sufficiently normal to be at large, but there are few of us who haven't our mental kink, our little secret compulsion or phobia or complex or personality defect. We would be more successful and happier if we could rid ourselves of these queernesses. Can we? Let's see.

XVI

*Sometimes There Is a Little Queer*

Do you remember Father Doyle?

He was the hero-priest of the First World War. There was no sacrifice, hardship, labor, he would not endure for his boys — and yet he had a constant, gnawing fear that he was not doing enough. He felt personally guilty for their sufferings as though *he* were somehow to blame, and he was continually punishing himself for his inadequacy. He would flagellate his body with razor blades and all day long, as he went from trench to trench and hospital to hospital, he sent up prayers, sometimes no more than mere ejaculations, frequently many thousands a day. This, we must admit, was not entirely normal. Father Doyle, saintly and intelligent though he was, was “a little queer.”

You may have heard the story of the musician, Liszt, that when he was seventeen his fiancée's father broke off their engagement and that in despair the young composer sought to take holy orders. His confessor, a great lover of music, refused to countenance this, whereupon Liszt withdrew to his room, withdrew to his bed, and there remained for one year and a half, never once speaking, even in response to the most urgent questioning.

Perhaps you also recall Rousseau's account of the strange case of his friend Grimm. Rejected by an actress, “he fell suddenly into the strangest sickness one has ever heard of.” He went into a lethargy so profound that he appeared dead, neither moving, eating, nor speaking. Though his eyes remained open

day and night, he seemed neither to see nor to hear. Then one day he arose, dressed himself, and thereafter acted as though nothing out of the ordinary had happened.

You may possibly have heard of even stranger cases — such, for instance, as that of the saintly Estatica of Caldara of whom the Earl of Shrewsbury has left us an account. For eight years, at the time the Earl saw her, she had not left her bed. Clad in a white robe, her hair unbound, she knelt for days at a time in an attitude of ecstatic adoration before a crucifix set up at the foot of her bed. Being young and beautiful, she drew many pilgrims. Usually her confessor was present and, as soon as he spoke to her, she came out of her trance and appeared perfectly natural, replying intelligently to all who addressed her, aware of the reality of her surroundings, and seeming to be a normal young girl, very gentle, very sweet and kind, until, without warning, she slipped back once more into her attitude of adoration. On her hands, feet, and sides were the stigmata of the crucifixion and every Friday she went through the agonies of the crucifixion, though she was never informed what day it was.

And then there was the great French philosopher, Auguste Comte. Few more distinguished intellects have been at the service of humanity than that of Auguste Comte. Before Darwin conceived his theory of the evolution of man, Comte had discovered the law of Social Evolution and built up his great Positive Philosophy.

And yet this man, normal in all other respects, when he fell in love with Clotilde de Vaux invented a new religion to do her honor. Not God, but humanity, was the object of his worship. Clotilde's chair was set up as an altar and three times a day he held religious services before it, offering up, in place of prayers, a patter of mystic numbers and stereotyped phrases, meaningless except to himself. He drew many converts who daily went through this ritual with him. In the end he made over his whole system of philosophy in order to include this new religion.

You have yourself undoubtedly encountered individuals who,

it not so odd as these historical personages, yet were certainly "a little queer" — people who had strange compulsions, obsessions, phobias. They must avoid every crack in the pavement, always sit on the aisle in a theater, count the figures in wall-papers; or they would never go out unaccompanied, go above the third floor in a building, cross water, sit in a room with the doors closed. There is no end to the things people, otherwise perfectly normal, may feel a compulsion to do or not to do.

What is wrong with these people? Obviously they are not insane. Father Doyle was not crazy, Liszt was not mad, even the Estatica was not demented. What then?

They are neurotic.

What is a neurotic?

A person who is not desperately ill mentally but only somewhat ailing. Perhaps we could compare the neuroses to the common cold which hits practically everybody at one time or another and many of us frequently; which has more victims but fewer fatalities than pneumonia; which does not completely incapacitate us for life but does somewhat cripple us. A neurosis doesn't usually land us in a mental hospital but it sometimes makes us less welcome in society.

The neuroses are, for the most part, generally admitted to be psychogenic. The presumption is this: —

In the minds of all of us is conflict. Conflict is inevitable and normal. But we dread inner conflict, so we try to thrust it out of consciousness. "In the resistance of the will against allowing what is distasteful to come into the illumination of the intellect lies the place where insanity can break into the mind." This is not Freud speaking, but Schopenhauer, a hundred years before Freud.

What we cannot accept, what we try to flee from or to bury, becomes a hidden source of illness, a focal point of infection. Buried in the unconscious, the conflict goes on without our knowledge and eventually produces a neurosis. It is not the conflict itself which causes the nervous disturbance, but its repression.

During the First World War it developed that there were more cases of nervous disorders among — which would you say, the British or the French? The British. Stolid and phlegmatic in comparison with their Gallic comrades in arms, they yet broke more often beneath the strain. Why?

The British code of the stiff upper lip, the determination not to admit fear, even to oneself, the stern repression of all “unmanly” emotion, is what fosters the neuroses. These tactics result in thrusting all doubts and fears into the unconscious where they can do the most harm.

But the *poilu*, Lord love him, has no compunctions about saying to a comrade, “God, I was blue with fear!” He will confess freely to anyone who will listen that his hands shook and his underpinnings were about to give way. He is accustomed to airing his emotions, even the least flattering ones, and so harbors fewer repressions and inhibitions. Courage, he knows, is not the absence of fear but the ability to carry on in spite of it.

McDougall tells the story of a British soldier who, while an arrant coward, did not develop a mental illness because he freely confessed to his cowardice. He could never overcome the palsy of fear that overwhelmed him on going into battle, he said. But this he could and did do: beg to be ordered to the hottest spot on the front where he could die a coward’s death.

A conflict unacknowledged and unresolved, bringing in its train many and various nervous disorders, all the way from indigestion to states of mind practically indistinguishable from insanity — this is a neurosis.

What can the psychiatrist do about it? Can he help, can he cure those of us who are not desperately ill mentally but only a little ailing?

Of course he can.

Take the case of Anthony Gaige, a successful and wealthy banker who developed some very strange notions indeed. One night Gaige’s wife awoke with the sudden conviction that he was no longer in bed. Switching on the light, she saw that he was indeed gone, not only from the bed but from the room.

Nor was he anywhere to be found — in the bathroom, the halls, the children's room.

She went systematically through the lower rooms of the house, and finally came upon him in the kitchen, crouched before the refrigerator, not in quest of a midnight snack, but, as he sheepishly explained, "taking inventory." Of what, for heaven's sake? Of supplies, you know. Just making sure there was plenty of food on hand. So easy to run short.

It grew to be a habit with him. Nor was that all. It became imperatively necessary for him to remember all sorts of unimportant details, such as telephone numbers, addresses, names, stock-market quotations, automobile license numbers. To the late Henry Putnam, Lightning Fruit Jars and Bottle Stoppers millionaire, who could repeat from memory every line of every play by Shakespeare, this might not have proved impossible, but to Anthony Gaige it was. He began to crack beneath the strain. Eventually he was sent off to a mental hospital and there —

But first let us consider a quite different case and then see how the psychiatrists handled both of them.

Alfred Kittridge went to a skin specialist with an intractable skin disease. In the groin the flesh was swollen, scaly, fissured, causing severe pain. For over a year the specialist treated him with every medication he knew, with no result. This was particularly unfortunate as the young man was engaged to a wonderful girl to whom it was becoming increasingly embarrassing to explain the delay in their marriage — and naturally he couldn't marry in *that* condition.

One day it occurred to the doctor that the trouble might be psychogenic. He sent Kittridge to a psychiatrist.

Now the strange thing happens. The man who was mentally ill and who during four years in a mental hospital resisted all psychological treatment (including psychoanalysis), Anthony Gaige, was finally given the metrazol shock — and cured. And the man who was physically ill was treated by hypnotism — and cured. During the hypnotic trance it came out that he really didn't want to marry at all, and as soon as he broke off his en-

gagement to the wonderful girl his skin disease cleared up in no time at all.

The mental illness resisted psychological treatment, yielded to physiological. The physical illness resisted physiological treatment, yielded to psychological. Strange are the ways of the Body-Mind.

Say that a neurosis is psychogenic. The treatment is psychotherapy, taking the word in its broadest sense to mean treatment by influencing the mental life. *Any* treatment that acts primarily through the mind, even a physiological treatment, is thus a form of psychotherapy. Drugs may be psychotherapy, or the surgeon's knife, or exercise, or baths, or electricity, quite as much as psychoanalysis itself.

There was a famous physician of antiquity, a Dr. Philodotus, who once had a patient who knew (and no one could tell her otherwise) that a snake dwelt in her belly.

"That's bad," said Philodotus gravely. "We'll have to do something about that. I have a powerful emetic which will certainly cure you. This serpent can't possibly stay down when everything else comes up."

He gave the woman this emetic and, sure enough, there in the basin she used squirmed a snake — naturally, since Philodotus had put it there.

That, though he used a drug, was psychotherapy.

Henri de Mondeville, along in the Middle Ages, gave this advice to doctors: —

"Physicians, keep up your patient's spirits by music of viols and ten-stringed psaltery, or by forged letters describing the death of his enemies, or by telling him that he has been elected to a bishopric, if a churchman."

This, too, is psychotherapy — of the more orthodox variety.

A confirmed physiological psychiatrist will say: "Even if I use psychotherapy, it is still physiological. Say I talk to a patient, endeavoring to arouse certain emotions. Arousing these emotions stimulates certain hormones and it is the hormones which produce the desired effect. Still physiological, you see."

A confirmed psychoanalyst will say: "Even if I employ a

physiological treatment — electrotherapy, hydrotherapy — it is still a psychological measure. It works primarily by influencing the emotions. How account for the success of the shock treatments — when they are successful? Very simple.

“The modern shock treatments are merely a revival of the old cruelty treatments. Like dropping the insane suddenly into a pit or rotating them in chairs, it acts psychologically. Basically we are all angry with the insane. They are against our reason, our decency, our conventions. We are angry with their stubbornness, their resistance to all our efforts to help them. So we have always treated them cruelly. First, as witches, we tortured and burned them. Then, as criminals, we threw them into cells. Then, as intolerable disturbances, we quieted them with drugs. Now physical brutality is superseded by a pharmacological knockout.

“When the psychotic are improved by such methods it is through psychotherapy. They are terrified or flattered or tricked into recovery. For example: Until quite recently the insane were left severely alone. They had a number instead of a name and nothing was done for them. They were nonentities.

“Suddenly all that is changed. Enter the physician with a corps of nurses and attendants, a formidable pharmacopoeia and instruments, and they spend the better part of the day working over him, waiting upon him. And this they do every day. Now he is somebody. Now he claims the attention of people of importance. His every word and gesture become significant. His self-esteem is gratified. He is *flattered* into recovery.”

You see? Still a million miles apart, our physiological and our psychological protagonists. To the former the metrazol shock which cured Anthony Gaige did so by changing the physiology of his central nervous system. To the psychoanalyst, the shock which cured when psychoanalysis failed did so by reason of the threat to life and the fear thus engendered, not by anything that the drug did to the body. In the same way the insulin shock treatment becomes to him “intravenous narcissism.” To him, all such measures are psychotherapeutic.

*Anything* which acts primarily through the mind may be

considered psychotherapy — not only hypnotism, re-education, psychoanalysis, but even drugs and the knife. Even a trick. McDougall describes the case of a soldier whose limbs were paralyzed and anesthetic. The cause had been diagnosed as post-diphtheritic paralysis but McDougall discovered that the man had actually become paralyzed at the time when his transport ship came within sound of the guns of Gallipoli. So it looked, you see, as though . . .

McDougall, a strong believer in hypnotism, hypnotized the man. Once hypnotized, the patient was ordered to move his legs — and lo, he could and did! But with such obvious signs of mental anguish, moaning and weeping, that McDougall desisted. His resistance to being cured was so strong that the psychologist decided to try other methods.

Show me, he said, just where this anesthesia and paralysis end. The soldier drew a line with his finger at the top of his thigh. There. Very well, said McDougall, that is the high-water mark of your condition. It will recede slowly, every day retreating a little lower on the leg. Each morning thereafter he asked the soldier to show him where the anesthesia and paralysis ended *now* — and sure enough it was always an inch or two lower. Thus he drew off the anesthesia and paralysis like a stocking. A trick — but a mind that is fooling itself must sometimes be fooled.

All these methods may, broadly, be held to be forms of psychotherapy, though usually the word is used in a narrower sense to mean the conversational methods by which the doctor endeavors to destroy in the patient certain unhealthy emotions and to arouse healthy ones. Psychoanalysis, a form of psychotherapy, is, of course, one of the outstanding treatments for the neuroses.

True, since the recent triumphs of the physiological men, psychoanalysis is no longer the spoiled darling of the profession. The psychoanalysts are no longer the glamour boys of happier days with outlying secretaries, far-flung suites of offices, expensive modernist *décor*s. They do not ride so high, wide, and handsome as in the days before the malaria-fever treatment,

the insulin shock treatment, metrazol, dilantin, vitamins, hormones, and enzymes. Their wings are clipped a bit — but they still fly.

Their science, even if brilliantly successful in the treatment of the neuroses (and few psychiatrists outside the fold of psychoanalysis will admit that it is), labors under such severe practical disadvantages that, even without the victories of bacteriology and biochemistry, it would have lost ground. For one thing, there never could be enough psychoanalysts to go around. Since some thirty million people in the United States alone have at least a touch of neurosis, how could a thousand or so analysts reach them all? An analysis takes an hour a day every day in the week for one or two years, and a doctor can work only about eight hours a day. Figure out for yourself how many patients he can handle in a year. And then ask yourself, even if there were no dearth of psychoanalysts, how many of these thirty million people could afford one hour a day every day in the year at ten dollars or possibly fifty dollars per hour, the fee of the top-notchers in their heyday. It must remain a therapy for the well-to-do unless and until some way can be found to bring it within the time and money limitations of the mass of people.

Freud foresaw this. As far back as 1918 he said that the underprivileged had a right to this therapy, and that eventually there must be a Psychotherapy for the People based on psychoanalysis.

But how? How can six hundred and fifty hours (or even three hundred and twenty-five) and thirty thousand dollars (or even five thousand) be reduced to the hours and dollars available for medical treatment to the mass of people? Until they can solve that one, psychoanalysis must remain a gardenia in the buttonhole.

The men of today are working on it. Already they have several tentative answers.

Here is one: Obviously we can't, by personal treatment, reach all who need psychoanalysis. But we can do much to *prevent* the neuroses. Just as medicine did its most effectual

work toward stamping out tuberculosis and typhoid by educating the public concerning the symptoms, the causes, the precautionary measures to be taken against these diseases, so we can educate people concerning the causes of the neuroses. We will use every available medium and agency to get this information across to the public — books, lectures, periodicals; public-health agencies, parent-teacher associations, child-guidance clinics, adult mental clinics, schools, colleges, mental-hygiene societies, the army, hospitals, welfare agencies, prisons, courts. We will broadcast the underlying principles of mental health so that all may know them, such as that mental illness can be precipitated by life situations, by wrong attitudes toward life and people and personal problems, by faulty training of children — yes, particularly by faulty training of children.

This was something new in medicine. Never before had general practitioners been expected to understand and treat the mind as they did the body. Never had there been rules for mental health. Never had people been warned that, if they wished to remain normal, they must watch their mental processes just as they must check up on their physical condition if they desired to stay physically sound. Never had the public been told that mental illness can be *prevented*, just as can physical illness, by learning and following the rules of mental hygiene. Never had they been given the hope that, by taking the proper precautions, they could avoid mental breakdowns. Concerning their sanity they had been apathetic and fatalistic; not that they didn't care, but that they had always believed it was one of those things you couldn't do anything about.

Now all that is changed. We know that prophylaxis counts heavily. It wasn't the psychoanalysts alone who started this campaign, although the principles of psychoanalysis underlie the movement. All psychiatry has rolled up its sleeves and gone into the crusade, and the crusade was started by one man — one man who himself had lost his reason and regained it, Clifford Beers, who wrote his story in *A Mind That Found Itself*. It was he, single-handed, who launched the Mental Hygiene movement. The psychiatrists have followed and enlarged it.

The psychoanalysts have still another answer. Let Dr. Franz Alexander, Director of the Institute for Psychoanalysis in Chicago, state it.

"Physiological measures make a great appeal to doctors," he says. "They are engineers at heart, and anything that is tangible, mechanical, easily understood, is right down their alley.

"But the mind isn't a machine. It is far more elusive, complicated, and difficult to understand than the body. Only such a subtle and versatile technique as psychoanalysis, which is the science of human relationships, can uncover its problems and resolve them.

"Now how are we to make this tedious and expensive therapy available to all who need it? The big problem of psychiatry today is not so much the treatment of psychotics, comparatively few as against neurotics, but the millions of people leading maladjusted, bogged-down lives. Can we develop a Brief Psychotherapy, based on the principles of psychoanalysis but condensed, standardized, and reduced to dozens of treatments instead of hundreds?

"I think we can. Naturally it can be used on only a limited number of cases, reserving the prolonged psychoanalysis for the severer cases. We've been trying out such a brief course for several years. We can't, of course, go into dream analysis and free association. No, what we do is to encourage the patient to talk frankly and freely and guide his disclosures into the most fruitful channels. We can in this manner uncover repressions, conflicts, childhood episodes, and often we can indicate the solution.

"This method is not at all like the old-fashioned suggestion and other common-sense techniques. It is different from anything that has ever been tried before. The old psychotherapeutic methods didn't recognize that the patient's neurotic symptoms arose out of certain experiences during his development, particularly during early childhood. They did not depend upon a dynamic understanding of the patient. They did not envisage that a human being is conditioned to a neurosis by his experiences and can be reconditioned out of it by analysis

of those experiences, just as Pavlov's dogs were conditioned to nervous breakdowns, and then reconditioned to normalcy. This briefer technique, which we call Psychoanalytic Psychotherapy, is based on these new principles.

"We find that we can often give people the necessary insight into their problems in a few interviews. Not those suffering from profound chronic neuroses, not those with ingrained character defects, but those who are caught in a sudden, disabling crisis, the acute cases — in a word, the most hopeful cases. Here we sometimes get dramatically swift recoveries.

"A college girl who was visiting her fiancé's family suddenly developed an acute illness — nausea, insomnia, loss of weight, inability to attend her classes or any social gathering. Our analyst saw her nine times in six weeks. After one treatment she returned to her classes, after nine she showed remarkable improvement. Today, seven months after treatment, she is married and happy. The trouble? A fixation on her mother — a complete dependence upon her and a feeling of guilt and anxiety whenever she was away from her, especially with a boy.

"Another case was that of a boy who for several years had been 'acting queer,' sitting alone in his room, having his meals there, often refusing to go to work, speaking only when necessary, smoking incessantly. He was convinced that his lips were enlarging and that everyone noticed it. He saw the analyst once a week for six weeks. It came out that he had become so utterly discouraged that an overwhelming but unconscious desire to retreat to a dependent childish existence took possession of him. He yearned for the time when he was a suckling babe, whose life centered about his mouth. Hence his idea that his lips were large and protruding. Today he has been well for over two years, is engaged, at ease with people, and the delusion about his lips has completely vanished.

"We are beginning to hope that with this Brief Analysis we shall be able eventually to reach thousands where once we reached hundreds. Approximately one quarter of the population is in need of such help — and that's a lot of unhappy people. Before Freud, the idea that we could change a personality

was unthinkable. Now we know that, although we can't alter the foundations, which lie deep in heredity, we can refashion the superstructure, and that's what counts."

From a psychologist in England comes another of these practical answers. Mass Psychotherapy its author, Snowden, calls it. It is not, of course, true psychoanalysis; it merely uses a few of its more common-sense principles.

After a history of each patient, exploring his childhood, school life, adolescent working life, and married life, has been individually taken, he is assigned to a group of perhaps twenty people whose cases are similar. To each group a series of one lecture a week for eight weeks is given, and after each lecture each member is separately interviewed for a few minutes. No one's problem is unique; most neuroses are of the anxiety type; though symptoms vary, the basic causes are usually similar — these are the considerations which make it feasible to lecture to and treat a group of neurotics.

The technique of this rapid psychotherapy depends upon the considerations that in nearly all cases of anxiety or loss of function the cause of the condition is known to the patient or can be elicited by careful questioning, and that the patient has not associated the symptom with the cause. When it is then made clear to him that a certain unsuspected episode *in the past* is the cause of his present symptoms, and that there is therefore no present ground for them, the neurosis often disappears immediately or at least the way is paved for swift re-education.

For example: A man has claustrophobia. Can't breathe in a small, enclosed space, faints or becomes panicky in a room with the doors or windows locked, is uneasy even in a theater, particularly during the few moments of darkness before the curtain goes up. Why?

Stimulated to explore his early memories, he recalls an almost forgotten episode of his childhood. His mother took him to visit certain caves where part of the way they had to go on hands and knees through long, narrow passages. It was close and dark and silent. Suddenly, as his eyes became accustomed to the darkness, he saw in a larger space ahead a terrifying flight

of hideous creatures, hundreds upon hundreds of bats. Soon they were flapping all about him. And now he remembers that it was just after this that he would never pull down the shades in his room, lock the bathroom door, venture down a dark alley.

"Good Lord," he cries, "it is those bats I'm still afraid of!" He gives a big laugh. "Well, that's that. Can't see how I'm ever going to feel afraid in a small room again."

That sort of thing. . . . Snowden's classes to treat neurotic patients by mass psychotherapy have proved a great success.

That seems a practical answer. And here is another example of the way psychoanalysis is reaching out to influence the lives of thousands, many of whom have never even heard of it. Dr. Beatrice M. Hinkle, one of the pioneer psychoanalysts in America, says: "It's not what is being done by a few thousand psychoanalysts in their offices that is important. It's what psychoanalysis is doing out in the world, to the lives of people everywhere.

"Psychotherapy has been transformed by the ideas of Freud, Jung, Adler. Doctors and psychiatrists may think they owe nothing to psychoanalysis but they are constantly using its illuminating concepts. Before Freud, psychotherapy was limited to hypnotism and suggestion — and very little of that.

"Doctors everywhere today use the underlying principles of psychoanalysis for the better understanding of their patients. Educators owe to it progressive new movements. Parents owe to it their better, more comradely relations with their children. The younger generation owes to it most of its new freedoms. Because of it judges understand better the problems of juvenile delinquents. Social workers carry it into the homes of neurotic children. The relatives of the mentally afflicted are spared social ignominy because of the understanding of the neuroses which psychoanalysis has helped to spread. Writers produce more profound and fascinating plays because of it. In many such ways it is changing humanity and our understanding of it."

Other men and women are employing psychoanalysis in still other ways. Few psychiatrists, however violent their loathing and vocal their scorn for psychoanalysis, but will grant that it

sheds light upon the workings of the diseased mind. Still others, unable to swallow in toto its fantastic Oedipus and Electra complexes, its marvelous transformation scenes, its infantile sexuality, yet accept its basic principles, such as that neurotic difficulties are the result of hidden conflicts and that the sources of the difficulty must be sought in childhood.

With this as a basis, various practitioners have developed psychotherapeutic measures that are common-sense and practical and frequently achieve amazing results. McDougall of Oxford worked out such a method of mental analysis and so did the eminent Dr. William Healy, formerly of Chicago, now of Boston, who succeeded so well with juvenile delinquents. Much, they assert, may be accomplished toward the cure of neuroses by tactful, patient conversations founded on the principles of psychoanalysis and conducted by competent psychologists.

You would scarcely expect to find an advocate of the metrazol and electric convulsive shocks coming out for any form of psychoanalytic treatment. Yet here is Dr. Bennett, who first discovered the value of the convulsion for the chronic depressive psychosis, maintaining that psychotherapy is the only sound therapy for the neuroses and even that "modification of psychoanalytic technics through dream interpretation and free association in order to teach the patient how unconscious motivation influences his behavior" is helpful. By the psychotherapeutic measures he outlines, a large majority of neurotic patients can be restored to useful work capacity, he states, in a few weeks.

Few out-and-out psychoanalysts would go so far.

As already noted, the attitude of psychoanalysis toward the various shock treatments is, briefly, this: first, that they do not really cure; second, that when there is improvement it is due entirely to psychological factors; and third, that they are brutal. Now we come to a treatment which curiously combines the two extreme points of view, using the physiological shock on the premise that it acts psychologically—like Dr. Philodotus' emetic.

The patient, neurotic or psychotic, is subjected to a faradic (high-frequency) current by means of electrodes attached to

his forehead and the back of his neck. This produces a mild reaction, nothing faintly resembling the hair-raising electric convulsive shock. The patient's eyelids and facial muscles twitch, his head jerks, he looks startled and frightened and pained, as well he may, but he experiences nothing approaching a severe electric shock. The current is turned on for half a second, off for half a second, and this is continued until the patient has received fifteen tetany-like shocks, the whole performance lasting fifteen seconds flat. This treatment is given daily for as long as is considered advisable.

Now this treatment is not, according to its author, Dr. Nathaniel Berkwitz of Minneapolis, a physiological treatment, as the shock treatment with insulin is to Dr. Sakel or the electric convulsive shock is to Dr. Kalinowsky. No, it is a combination of physiological and psychological, the latter playing the predominant role.

"For you see," he says, "it isn't really a severe shock — it doesn't even stun. We use only ten to twenty milliamperes as compared with three to six hundred with the electric convulsive therapy. It is merely a stimulation, an excitation, you might almost say a *push*, to force the patient to face reality. And this excitation is only the introduction to the treatment. It jars open the fast-locked doors of the sick mind and allows the psychiatrist to walk in with everything he has — explanation, suggestion, encouragement, reassurance, the most important part of the treatment. The difference in results obtained by various men who have tried it is, I believe, entirely due to the differences in the psychological approach to the patient. The shocks, and the drugs which I give following the shocks, merely put the patient in an accessible frame of mind. It is the talks which completely alter his psychology.

"If a person cannot face unpleasant realities in life he may resort to various mechanisms. These are, first, withdrawal, in which he lives in a reconstructed world (schizophrenia); second, blaming others for his shortcomings (projection or a paranoid condition); or third, blaming himself (depression). Instead of making life easier, these various escape mechanisms

tend to make it more difficult. A vicious circle is thus created. Interviews alone fail in most instances so other means must be sought. In recent years shock treatments in various forms have been found to be effective.

"Shock treatment does not alter the pre-existing personality of the patient, but it assists the physician in removing delusions and other mental aberrations of recent development. In the more chronic cases these aberrations are systematized and incorporated into their personalities. For this reason shock treatment should be administered in the early stages. This provides the patient with a fresh start, but for permanent results, education and a healthy rehabilitation are necessary.

"It appears," continues Dr. Berkwitz, speaking of certain patients who improved slightly after a few treatments and then relapsed, "that the patient loses some of his symptoms, regains some insight, and tries to decide whether or not he wants to face reality at that time." Having decided, he goes forward to cure or turns back to neurosis or psychosis.

(You can see the eyebrows of the physiological gentlemen climbing skyward. Psychotherapy as an adjunct to shock — good. But shock as an adjunct to psychotherapy — really now!)

And the results of Dr. Berkwitz's combination treatment? According to his own report, they compare favorably with some of the more drastic shocks. During the war Major Berkwitz was a Division Neuropsychiatrist in the European Theater and had plenty of opportunity to use his treatment there and later at a military hospital in the States, where he was Chief of the Neuropsychiatric Section. Principally he found it valuable for localized dissociations such as hysterical bent backs, hysterical paralyses, confusional states and diffuse dissociated states such as amnesias and catatonic reactions. By giving sodium amytal before treatment he reduced the patient's fear of the electric stimulation. He is as enthusiastic as ever about his method but admits that it still awaits wide acceptance.

And now what of the performance of psychiatry in World War II?

Here was a test of the minds and souls of men such as they

had never undergone. This was a much, much tougher war than the First World War. Men were subjected to far greater dangers, performed far more difficult tasks, under far more adverse conditions than in 1914-1918. The noise alone was beyond anything known in that war. Never before had men carried and unloaded blockbusters that blotted out whole towns, flown hazardous missions at terrific heights and speeds, dive-bombed objectives from 30,000 feet, operated machines demanding the utmost precision and coolness under nerve-shattering conditions, and, imprisoned in tanks, driven at frightful speeds into a hell of slaughter. Modern warfare produces pressures to the breaking point of the organism.

It was the job of the psychiatrists to see to it that only men of the toughest mental fiber were sent into this war. Their goal was to build an Army, a Navy, an Air Force of normal men. They screened out, because of mental or nervous disabilities, five times as many as in the last war. One third of all rejections were for psychiatric reasons.

Subjected to sufficiently strong pressures for sufficiently long periods, even normal minds and nerves will give way. Men broke in this war who would never have broken in the last. *But* — while normal may break, they swiftly mend. Those who broke in combat proved the most susceptible to recovery. Up to 80 per cent of these men responded to treatment. In one big push 89 per cent were returned to active duty — and remained there.

During any great battle, among the stream of wounded from the front trailed men who had no physical wounds. They walked like somnambulists, their eyes with that thousand-yard stare, their knees sagging, their guns dragging. Some would fling themselves on the ground, whimpering, at every shell-burst. Some would flee in panic from anyone who approached them. Others would appeal for help like hurt children. Some were hysterically blind, paralyzed, mute, deaf. Many continued to tremble for days after the battle. Many wept at night.

The battle-shocked . . . The men who couldn't take it any longer. Men shaken to the roots of their being by the seeing

and doing of things they could no longer bear. Normal men, most of them, who had reached the breaking point only after long periods of fighting preceded by days of marching with little food or sleep, and added to that usually the psychic wound of the loss of a buddy or a beloved leader, a sense of guilt at killing, hatred for the cruelty of the enemy, resentment over a military blunder.

Sometimes they broke en masse — at Dunkirk, at Guadalcanal. Of Guadalcanal Lieutenant Commander E. Rogers Smith, a medical officer said: —

“Never before in history have such a group of healthy, toughened, well-trained men been subjected to such conditions as the combat troops of the United States Marine Corps faced during the days following August 7, 1942. The strain and stress experienced by these men produced a group neurosis that has not been seen before and may never be seen again.”

For weeks these marines endured the unendurable — rain, heat, insects, dysentery, malaria, little food and less sleep. They were bombed and strafed day and night. They were totally unprepared for the type of jungle fighting waged by the Japs. They were alone on the island, with no way of knowing why relief did not come. They had no hope of winning, of rescue, of aid. This was not the swift rape of Pearl Harbor nor the acute crisis of Dunkirk but the worst of both, prolonged for weeks.

“The result,” said Dr. Smith, “was not bloodstream infection or gastrointestinal disease, but a disturbance of the whole organism, a disorder of thinking and living, of even wanting to live.”

An epidemic of neuroses broke out. All the men lost weight, up to forty-five pounds. They developed amnesias, tremors, palsies, panic states, headaches, crying spells, nightmares. And it was months before they could be shipped back home for treatment.

“Even after their arrival, the slightest sharp or sudden noise would cause them to jump or run from the room. A mild reprimand might produce some sort of outburst or an A.W.O.L., and the fear that they would be thought ‘yellow’ was universal.

It was pathetic to see how grateful they were when told that no one could ever consider them cowards."

It is an essential part of treatment that it be given at once and as near the front as possible. This was not possible at Guadalcanal. By the time the men reached the States it was already late. In many cases their symptoms had become fixed, the neurosis chronic.

Psychiatric casualties in this war were of three kinds: those who broke in combat and could be given immediate treatment; those who broke in combat and could not be given on-the-spot treatment; and those who broke without ever having seen combat, by far the largest number. The handful of military psychiatrists could not treat them all. They had to choose. The Army made its decision on the basis that its job was not so much to save a man as *to save a man for the Army*. Those cases (the men who broke in combat) which offered the best hope of quick recovery and return to duty, were therefore given priority. Those requiring long-term treatments received a medical discharge.

Since World War I, psychiatry has developed new techniques for curing the neuroses of war — "walkie-talkie" treatments, the boys called them. So suppose now we see what these new methods are, what psychiatry can do for these neuroses when given a chance, what treatments yielded that amazing recovery figure of 80 per cent in combat neuroses.

■

## XVII

### *The Walkie—Talkie Treatments*

MAURICE D'AMICO was a paratrooper. According to a paratrooper, if you let the Army stand what would come to the top would be the Air Force, and if you let the Air Force stand what would come to the top would be the paratroopers. An arrogant breed of men.

Maurice's two younger brothers were likewise paratroopers and all three went to North Africa in the same unit. At the battle of Oran the three were forced down behind the enemy lines. Parachuting to earth, Maurice saw one brother killed in mid-air and the other blown to bits on the ground. He himself was only slightly wounded, escaped into his own lines, and was soon back on active duty.

Several months later, General "Ike" visited that part of the front. D'Amico, taking part in the demonstration, jumped from his plane at 27,000 feet. A faulty connector link in his parachute hit him on the head, knocking him unconscious. When he came to in the hospital, he was completely mute. \*

Since the head wound was negligible, his vocal apparatus in perfect working order, and there was no organic injury of any kind, he was turned over to a psychiatrist. What Dr. Smith — the Army courts anonymity for its doctors and patients, preferring to have them all called Smith or Doe — proceeded to do for d'Amico was unlike anything any doctor in World War I had done for his patients, for the simple reason that the drug which Dr. Smith shot into Maurice's veins hadn't been discovered then. You've read about this drug in accounts of murder trials.

It's the biochemist's gift to the detective-story writer — the "truth serum," remember?

In the hands of the psychiatrist, it has other and more valuable properties. No fear of Maurice's lying — he couldn't utter a word. But the dose Dr. Smith gave him put him into a deep trance. He lay with eyes closed, seemingly asleep, but able to hear and answer questions — if he could speak at all.

That was what Dr. Smith wanted to find out. He asked Maurice if he could hear him and Maurice nodded.

"Repeat these words after me," said Dr. Smith.

The amytal-drugged patient is docile. Maurice opened his mouth and repeated, "Father . . . mother . . . doctor . . ."

"You see, there's nothing wrong with your organs of speech," Smith told him. "When you wake up you'll be able to talk as well as ever and you'll remember everything you've said. Now tell me, what's the worst thing that's happened to you in this war?"

Maurice's lips quivered. Tears formed, rolled down his cheeks.

"When was it?" the doctor pressed him. One by one he named off the battles in which Maurice had fought, came to Oran.

"Oran," d'Amico whispered.

"Tell me about it."

Stammering at first, hesitating, but gradually gathering impetus, Maurice poured out the whole story — Tony killed in mid-air, Arthur shelled on the ground. His voice broke, he sobbed.

"It was all my fault," he said. "Those kids would never have joined up if I hadn't encouraged them. I am guilty of their death. How can I ever face my mother?"

With that he woke up.

"I've had a terrible dream, Doctor," he said.

"But you're talking," Smith reminded him.

Maurice brightened.

"Why, so I am! Say, Doc, how did you do it?"

How? This drug, sodium amytal, which, for an hour or so, will make a cheery, companionable fellow out of a homicidal

maniac, has also this strange property — that it opens door after door along those dark corridors leading into the subconscious, doors which no one, not the patient himself, could ever force. Under its influence, inhibitions are broken down, buried memories can be recalled, and when the psychic wound which caused the symptoms has been discovered and the episode relived with all the emotional content it had at the time, the patient experiences such a sense of relief that he is able to face the reality he has been attempting to escape. You can see why the doctors call this treatment "verbal catharsis" and the patients "the walkie-talkie cure."

Maurice wasn't cured in a day. He still stammered a bit, particularly when the doctor asked him to talk about Oran. It was clear that what had caused his mutism was a long-buried sense of guilt for the death of his brothers. But with the doctor's help, he was soon able to see this episode in a more realistic light; and in four or five days, with rest, sedatives, vitamin-rich food, he was completely cured. He went back to his unit, landed with them in the battle of Sicily. There was nothing wrong with his voice that day.

It is this new treatment, called narcohypnosis, which was made possible by the discovery of new drugs, that is chiefly responsible for the amazingly high per cent, far higher than in the last war, of cures of combat fatigue in this war.

A variation of this treatment, preferred by some psychiatrists, makes use of another post-World War I drug, sodium pentothal. This is injected intravenously into the patient's arm as he lies in a semidarkened room and counts backward to 100 until the counting becomes confused, and finally ceases.

At this point some men begin talking spontaneously but usually the doctor has to start them off with a question, the description of a battle scene, if possible one in which the patient took part. The reaction is often startling. He becomes animated, begins talking in the present tense as though he were at the scene of action. He rises, walks about, gesticulates, relives the whole terrible episode in extraordinary detail, addressing the therapist as though he were his buddy, his crewmate. The thera-

pist, accepting the role assigned him, enters into the drama as realistically as possible. If the patient is a flier, he will walk about the room as though it were his plane, cowering at imagined flak, using anything at hand — a chair, a pillow — as protection, exhibiting openly the terror he concealed in the moments of supreme danger, always an electrifying revelation. His whole body becomes tense, his eyes widen, he sweats, breathes with incredible rapidity, and finally, his emotion becoming intolerable, often collapses.

And all through this strange, unconscious drama, the doctor, playing many roles, now discussing a plan of action, now the rescue of a wounded comrade, endeavors to administer comfort, support, forgiveness. When the patient awakes, the doctor helps him to recall the events he has just narrated and to accept them into consciousness, to continue to face squarely the painful past situation and emotions. Usually the man's ego finds a new fortitude and learns to master the emotions it had buried.

According to Dr. Grinker, of Don Cesar Hospital for air personnel, this sodium pentothal narcosynthesis is a different affair entirely from what he calls "the sodium amytal interview," or "narcoanalysis." In the latter, he holds, the emotional situation, although expressed and abreacted, is not synthesized. The buried memories recovered in unconsciousness are forgotten on awakening and the relative strength of the dynamic forces is unchanged; hence there is no loss of symptoms. Only the therapist has gained an insight into the problem.

But with sodium pentothal, he claims, there is a smooth and spontaneous transition from unconsciousness to consciousness, the painful events and emotions are remembered and accepted, and the symptoms are relinquished, a result not obtained with sodium amytal. Grinker holds that sodium pentothal yields better and more lasting results than does sodium amytal. Others believe both drugs accomplish the same thing. In the case of d'Amico, sodium amytal was quite as effective as pentothal would have been.

"Good — in fact, excellent," say those psychiatrists who believe in words rather than in drugs. "But after all, what is this treatment? Merely hypnotism. Hypnosis induced by a drug.

Good as it is, it doesn't do what straight psychological hypnosis can do. There is no such rapport between doctor and patient, no such thorough probing of the unconscious, no such uncovering of buried complexes. We can get better and more lasting results with straight hypnotism."

Very well then, what of the use of hypnotism in this war?

Private Bill Armour was a patient at Halloran General Hospital. Bill, from the day of his admission with a fractured leg, was a difficult patient. He was morose, depressed, quarrelsome. He kept insisting, long before it was time, on having his cast removed, was consistently rude to the nurses, disregarded instructions, and disobeyed regulations. Finally, one night, he went berserk. He told the doctor to go to hell, started a fight with another patient and almost throttled him. They called in Dr. — this time we'll call him Doe — the psychiatrist.

When he had Bill calmed down, the doctor questioned him about his outbreak. Armour knew exactly what was wrong. There was a conspiracy on to keep him in the hospital. No sooner was one ailment cleared up than they found something else wrong with him. The men kidded him, said he was faking.

"Look here," Dr. Doe finally told him, "I think I can help you, but I'll need your co-operation. I don't believe we've gotten to the bottom of this yet. To do that, there's a good short cut — hypnotism. What do you say we try it?"

Armour consented. When he was in hypnotic trance, Dr. Doe drew from him a quite different story from the one he'd just told. Actually, it now appeared, Armour didn't want to leave the Army. In spite of the dangers of war, he'd felt more secure than he'd ever felt in his life — no responsibilities, everything provided, nothing to worry about, nothing to do but take orders. And now he was going back to civilian life — a job he'd never liked, a wife who nagged, a mother who expected more of him than he could ever accomplish. It would all be back on him again — the whole terrible burden he had escaped when he was drafted.

Finally the doctor said, "I'm going to wake you up now, and you'll remember everything you've told me. You see," he con-

tinued, as Bill opened his eyes, "we got at the truth. The reason you are so antagonistic to everyone here lies not with them but with you. You recall what you told me?"

Bill nodded, puzzled.

"I thought I was glad to be out of it," he said. "Naturally I thought I wanted to go home — see my mother, my wife, start working again. But I see now that I've been dreading it, feeling I couldn't make good. . . . Well, so now what?"

Now it was up to the psychiatrist, in the days that followed, to persuade Armour that he was man enough to face life realistically rather than to flee from it into the Army or into a neurosis. He must learn to make consciously an adjustment to life on the basis of the facts and emotions he had dug out of his unconscious in hypnosis.

That is what hypnosis is, whether drug-induced or psychological — a magical key to the unconscious. Except for the long, laborious procedure of psychoanalysis, there is no other key.

We are all aware today — and we have read in the chapters on Freud and his followers — that beneath our conscious minds there exists this subconscious mind, that it is by far the largest and most important part of our egos. We have seen that this submerged part of us lives with an intensity and vitality that can wreck our conscious aims, that it is, among other things, a storehouse of memories too painful to be tolerated in consciousness. But these old memories and repressed desires, though living underground, are still active, still powerful. Most of our actions and emotions are motivated by these unconscious drives, not by our conscious purposes.

Ordinarily we can leave that Bluebeard closet locked but sometimes, when we are nervously ill, it is necessary to unlock it, to look squarely at the skeletons hanging there, realize that they are the cause of our illness, and adjust our behavior accordingly. So today the psychiatrist uses hypnotism to unlock that door, either psychological hypnotism or narcohypnotism. As a matter of fact the number of doctors equipped to employ straight hypnotism is not large. Unless he is an expert, it takes too long to get his man in the deep trance necessary for

successful treatment. A drug is quicker and easier. It may not be so deep a therapy; it is, nevertheless, very effective. The three cases cited are much alike. Only the techniques differ.

The neuroses of civilian life are no different than the neuroses of war. Only the precipitating factor is different. For the man at the front it may be days and nights of exposure to enemy fire, failure to have saved the life of a comrade, a disheartening retreat. For the man or woman back home it may be the witnessing of a horrible accident, an unfortunate home situation, failure in school or business. The disorder being the same, the cure is the same. For certain types of nervous disorders, hypnotism, in one of several variations, is today the treatment of choice. At last the medical profession is admitting it within the sacred precincts of *materia medica*. As they might have expected, now that they are ready to accept it, the public is not. It has been too long conditioned by the doctors themselves to thinking of it as a parlor trick, a vaudeville act, a dangerous weapon in the hands of the unscrupulous. Long ago the doctors assigned it to the lunatic fringe of science, building up in the public mind the fear and distrust which is now the biggest obstacle they have to surmount.

Hypnotism is undeniably a potent force. The subject obeys the hypnotist unquestioningly, carries out his orders not only during but after the hypnotic trance. Often the mere suggestion of the hypnotist can remove physical disabilities of long standing. At a word from the practitioner any part of the subject's body will become anesthetic so that he feels no pain when pricked or burned or even during a major operation. The flow of his bodily secretions will alter on command. He can do things which, in his normal state, are beyond his powers, such as supporting and lifting heavy weights. He may speak a language, perhaps learned in childhood, of which he has no waking knowledge. He sees, as though they were present, persons and scenes which the hypnotist orders him to see. People and objects actually present become invisible on suggestion. On waking he remembers or forgets whatever the hypnotist wishes. In a word, he is unbelievably credulous, docile, and receptive.

This is power. And it is this power the public has come to fear.

We fear, most of us, that if we are hypnotized we are weak-willed; we may not wake up; we can be forced to commit immoral or criminal acts; we will remain permanently in the power of the hypnotist.

These fears, doctors assure us, are without foundation. There is not the slightest danger of not coming out of hypnosis, any more than there is of not waking from normal sleep. Nor is hypnotism a battle of wills, since no one can be hypnotized if he does not wish to be. If anything, it is the more intelligent rather than the less intelligent who are most readily hypnotized. Nor can anyone be forced to commit an immoral act against his will and nature. And finally the power of the hypnotist is of short duration. This, so far as its therapeutic value goes, is its chief limitation. Frequently the hypnotist, whether because of his own inexperience or the inherent limitations of hypnotism, finds that he is not curing a condition but merely lopping off symptoms. As fast as one is lopped off, another appears. The chronic neurotic, as distinguished from the acute case, will often, as long as the situation from which he wishes to escape lasts, continue to manufacture new disabling symptoms. Cure his stomach ulcers and he'll retreat into insomnia. Cure his insomnia and he'll contract a skin disease, and so on. For this reason it is more valuable for acute than for chronic cases.

Dr. Sandor Lorand, a prominent psychoanalyst, says: —

"Hypnosis is most valuable for the acute neuroses, those of fairly recent origin, where we usually know the immediate cause of the symptom. Often hypnosis alone will remove the symptom. But if the symptom is based on a neurotic personality, then the cure would not be permanent, other symptoms would develop later, and we would have to use psychoanalysis to unearth the underlying complexes.

"We still don't know, for example, whether the men from the front who have been treated by hypnosis, or narcohypnosis, will remain well on their return home. No doubt many of them

are fundamentally normal men in whom extraordinary mental and physical strains have produced exhaustion. Such men should have no recurrences. But those who were already somewhat unstable personalities, before they were drafted, may break again. They should be watched and guarded. Some of them will need further treatment."

Dr. Morris Herman, Assistant Director of the Psychiatric Division of Bellevue Hospital, says: —

"Here at Bellevue we find hypnotism most useful for amnesia and the hysterical conversions, those cases where the patient has converted his fear or anxiety into a physical symptom such as paralysis or blindness — Hitler's hysterical blindness in World War I, for example. These people are obviously suggestible. Therefore a sufficiently strong countersuggestion from the hypnotist will often remove their symptoms. In the acute anxiety neuroses, such as combat and operational fatigue, it is an excellent procedure for enabling the patient to 'talk out' his emotional conflicts and so get rid of them."

Now you may want to know if *you* can be hypnotized. The answer is yes — unless you are insane, an idiot, or a tiny toddler. It depends more upon the hypnotist than upon you. Some doctors are not very good at it. Some claim that only 10 per cent of people can be put into a deep enough trance to obey suggestions without reasoning. But the consensus is that from 80 per cent to 90 per cent of normal people can be hypnotized and, with sufficient practice, be placed in a state amenable to treatment. You have only to witness a public demonstration of hypnotism by such an entertainer as Dr. Franz Polgar to know that the majority of individuals can be hypnotized quickly, easily, and to the point where they will obey commands unhesitatingly.

No doubt of it, hypnotism is a medical tool of great value. What is chiefly delaying its use today is the long-ingrained fear of the public. Although some military psychiatrists employed it, others did not feel free to do so because of the public's misunderstanding of the method and its opposition to it. Most psychiatrists are prepared to use it when indicated. Many doctors in other fields recognize its value. The doctors at the front

who have seen its results in combat neuroses will come home ready to sponsor it.

We have too long, through no fault of our own, regarded it as a mysterious, sinister, frightening power. It is no such thing. It is a very simple, harmless procedure, as easy and unfrightening as taking a pill. The doctor merely says, "You feel very comfortable and relaxed. Your limbs are heavy. You are drowsy. Your eyelids feel heavy. They are closing. You can't open your eyes. You are going to sleep. Sleep . . . sleep," monotonously and soothingly repeating the formula until you are in hypnosis. As easy as that.

And now a new variation of hypnotism is emerging from the research clinics. As you would expect, much of this research is being done by the psychoanalysts, whose starting point was hypnotism. They argue thus: Hypnotism is quick and easy but superficial. Psychoanalysis is profound but long and difficult. So what if we combined the two, shortening the time for the one and deepening the effects of the other?

Out at the Menninger Clinic in Topeka that's just what they did. They have recently completed a one-year research into this new method, which they call hypnoanalysis. They report "a dramatic shortening of treatment. It seems that sometimes hypnosis, in a way we don't yet understand, penetrates to the core of a problem."

This, so far as they can make out, is what happens: —

The psychiatric patient's difficulty is frequently that, although he understands his problem fairly well intellectually, the true feeling about it is lacking. Somehow feeling and idea have become separated. In order to obtain a cure, idea and feeling must be fused. In hypnosis the two often come together with great intensity. Hypnosis enables the doctor to discover why the split occurred and a brief psychoanalysis enables him to bring the two together again in the patient's conscious mind. Hypnoanalysis, they find, often works for those obdurate cases which resist hypnosis alone.

Not so very different, you will probably say, from narcoanalysis or narcosynthesis. To the psychiatrist there are real

distinctions. Each has a different specific goal, a different technique. But to the layman these distinctions are likely to appear theoretical.

In both England and America narcosis has been widely used in treating war and combat neuroses but the two countries do not see eye to eye on it. In both countries military psychiatrists used narcotics to produce prolonged sleep but whereas the Americans — Grinker, for example — used the drug primarily to get their man to talk, the British merely used it to put him into a profound sleep. They employ the sleep but avoid the talk and are well pleased with the results. To this Grinker replies that, after prolonged narcosis, his patients merely “wakened quieter and less anxious” but not otherwise improved. It is the talk, not the sleep, he claims, that does the trick.

For the neuroses of war insulin, also, came into the picture, in a form variously known as “sub-shock insulin therapy,” “modified insulin therapy,” and “ambulatory insulin treatment.” You get the idea? The patient is not given enough of the drug to put him into a coma — only a sedative dose. In England, for carefully selected types of war neuroses, they think well of this — and not so well of narcosynthesis. As for the Russians, they don’t even mention narcosynthesis; but then, it seems, the Russians practically didn’t have war neuroses anyway. At least that is the report of one non-Russian authority, who says that only 2 per cent of the forward hospital beds were used for psychiatric cases and only 1 per cent of those in the rear. This freedom from psychiatric casualties he attributes to the high morale of the Soviet Union. Wonderful people, these Russians!

The sub-shock insulin treatment was tried in a few of our military hospitals. Dr. A. E. Bennett, who visited Camp Carson at Colorado Springs, where it was being used on a small scale, was greatly impressed with the results. This is a revival of Sakel’s “borderline dose” for neurotics which he used as early as 1927 and continues to use, with excellent results. Long-standing depressions, phobias, and anxieties which resisted psychoanalysis often yield to this milder dosage of insulin, either plus or minus psychotherapy. In spite of the fact that it is a

physiological treatment, some even of the men who give it, and like the results, still insist that the physiological action here is nil, the psychological factor all — like the Pickwick character who said it wasn't the beer but the salmon that made him feel so good. Still the two schools of thought worrying that same old bone!

When we move from the neuroses of war to the psychoses — and most psychiatrists maintain that no one goes mad from the tensions of war who wasn't predisposed to madness — we have all those treatments already described. Some of these were used to a limited extent in our military hospitals but, as we have seen, the vast majority of psychiatric casualties, due to the shortage of personnel and lack of facilities, went untreated.

So the most difficult psychiatric problem will be the schizophrenic veterans. A large proportion of the war neuroses are self-healing on release from the Armed Forces, and the depressions tend to terminate spontaneously in time. They are a small number anyway in comparison with the schizophrenics, who constitute 60 per cent of all the mentally ill. Moreover dementia praecox is the special enemy of those in the age groups of our fighting men — from 18 to 40.

And for these young men the "treatment of choice" for schizophrenia, the insulin shock, is practically unavailable — at least is comparatively little used in the Veterans' Administration Hospitals. Instead, the cheap and easy way of the electroshock is taken. It is given for any and all mental disorders, no matter what the diagnosis — entirely according to symptoms. Some doctors in the Veterans' Hospitals are now saying, "in schizophrenia, as in the affective psychoses, the electroshock is the treatment of choice." This is not what psychiatric research and practice has so far proved — quite the contrary. Perhaps, as some recent, too recent, reports indicate, this therapy may recover or improve a certain number of certain types of schizophrenics. That is a debatable question. In England as in America there is general agreement that this is certainly not the preferred treatment for schizophrenia. Writing in 1944 of their

experiences during the war, two outstanding English authorities, William Sargant and Eliot Slater, medical officers of Maudsley Hospital, say: —

“Although convulsive therapy is no method of treatment of the schizophrenic psychosis itself, it can often play an adjunct part. Depression in schizophrenia, as in basically different disorders, is often much improved by a few electrical fits. The insulin treatment will itself be nearly always required to establish ground gained by convulsive therapy and to prevent the possibility of rapid relapse. The improvements claimed in the past for convulsions alone have mostly been symptomatic ones, without significance for the course of the disease, or have proved temporary. . . . The early satisfactory results (of convulsions alone) in schizophrenia, some of them brilliant, have not maintained themselves with time.”

In England as in America, insulin is still the treatment of choice for schizophrenia. . . . And few of our veterans will get it!

No one to give, to direct, to teach this technique? I have been informed that three years ago Dr. Sakel offered his services at a dollar a year to do just that. He never received an answer to his letter. He has never been asked to contribute his knowledge and experience to this biggest of war and postwar medical problems.

Almost always war has brought about great advances in the medical sciences. Straining to the utmost the ingenuity of the doctors, it develops a host of new discoveries, speeds up methods of treatment. If there is one thing the doctors have learned in this war it is that a man is not two things, a body and a mind, but one — a body-mind. Already this was a strong trend in medicine, but the war made converts of even the most reactionary doctors. Psychosomatic or somatopsychic (body-mind) medicine is based on the principle that a man is not an assembly job, a combination of organs and parts, but a man-as-a-whole, greater than the sum of all his parts, and different — in a word, a complicated human being. So, say these doctors, when something goes wrong with him, you can't fix him up merely by tinkering

with the part that's out of kilter. No, you've got to consider his emotional make-up as well as the disease — the color that his emotions give his illness and that his illness gives his emotions.

The doctors who have served with the Armed Forces have a new understanding of the total personalities of their patients. Those who formerly treated only the disease now know this is only half the battle. They have seen too many men who had been wounded, lost a leg or an arm, go into a mental tail-spin. As one young surgeon put it, "Good Lord, I see now that I've operated on people who didn't need it at all."

Internists estimate that between 60 per cent and 80 per cent of their patients are psychoneurotics, although firmly believing that their ailments are purely physiological. Psychosomatic disturbances are certainly half of any doctor's practice. Most of them are realizing that they must be prepared to treat, not only a man's heart or his liver or his lungs, but also his emotional reactions. To the men with this new outlook, a patient will no longer be merely a broken arm or an angina pectoris or a coronary thrombosis, but a suffering human being whose psychological reactions are quite as important as is his basal metabolism.

And so, although he won't need to acquire the difficult techniques of shock therapy, chemotherapy, brain surgery, psychoanalysis, and so on, the general practitioner should today understand the simpler methods of psychotherapy as outlined by Dr. Lawrence Kubie.

"Psychotherapy embraces any effort to influence human thought or feeling or conduct, by precept or by example, by wit or humor, by exhortation or appeal to reason, by distraction or diversion, by rewards or punishments, by charity or social service, by education or by the contagion of another's spirit. This broadest possible use of the term would also include the temporary lift of spirit through music, art, or literature.

"Simple psychotherapeutic expedients may be grouped under three main headings: (a) Practical support — consisting principally of advice, guidance, and assistance in the management of life situations and environmental difficulties through social

service aids, and so on; (b) Emotional support — consisting essentially of sympathy, exhortation, admonition, encouragement, humor, art, recreation, companionship, and such; (c) reorienting education — consisting primarily of efforts to alter the patient's habitual attitudes of guilt, fear, hate, and depression, by educating him to tolerate his own conscious and unconscious needs and cravings, his instinctual hungers, his familial jealousies and hates, etc."

The first two classifications cover such commonplace procedures as are used by any wise parent or teacher and should be tried first. If they fail, then the therapist must go on to the third classification, which is scientific psychotherapy, much more complex and difficult, both to learn and to apply, but still within the grasp of the intelligent general practitioner.

Already many medical schools, notably Cornell, Harvard, Columbia, offer courses and clinics in psychosomatic medicine, and the new New York University-Bellevue Medical Center states its program as "Full recognition of medicine as a social science, with the emphasis both in teaching and practice upon environment and psychology as aspects of illness."

It is from these schools and from this kind of teaching that the men will come who can do most to meet the present desperate situation, due to the shortage of psychiatrists. There are only some 3000 to 4000 trained men in this field, 2500 of whom are caring for the insane in institutions. We need, says Lieutenant Colonel Roy Grinker, M.C., in charge of Don Cesar Hospital, the Army Air Force Convalescent Hospital at St. Petersburg, Florida, at least 10,000 to 17,000 additional psychiatrists. To fill this gap he points to the way it was done at Don Cesar, where they trained their own young medical officers, giving them courses in psychiatry.

"We tried this type of teaching in the Air Force and it worked!" he says. Therefore why not do the same in medical schools, in hospitals during internships and residencies, and by means of postgraduate courses? Thus the general practitioner will be trained to use the simpler methods of psychiatry. The small-town doctor has always been able to perform the simpler

surgical operations; why can't he do the same thing in psychiatry? He may not, and he need not, be capable of treating the psychotic and the psychopath; he can certainly look after the vast majority of psychiatric cases — the neurotics and those with psychosomatic disturbances.

In spite of these modern trends in medicine, the war between the two schools of thought, between the physiological and the psychological approach to mental illness, still goes on, never more bitterly than in our own day. But need we deplore this? Out of their strife have come all the great discoveries of psychiatry. Each side, contending for victory, produces its proofs, and so we advance on all fronts.

The mind of man is the supreme manifestation on earth. It is so good that we can only wish it were better. And it can be better. The frontal lobes, our latest and highest acquisition, hold the secret of our future. They are both a liability and an asset. On the one hand, their too highly developed aggressive tendencies, insufficiently educated and restrained, drive us toward self-annihilation. Today we still have no other goals than those of Mousterian cave men — to grab and to hold. Since primitive man appeared on earth, the human brain has been chiefly conditioned by the principle of the will to power. If we continue to hold fast to these primitive goals, we must continue to fight, for conquest and possession mean war.

In the Time Capsule planted at the New York World's Fair, for the information of archeologists five thousand years hence (who are supposed to discover and dig it up), was deposited, among other instructive items concerning man circa 1940, a letter to posterity from the foremost scientist of our day. It says: —

Furthermore, people living in different countries kill each other at irregular time intervals so that also for this reason anyone who thinks about the future must live in fear and terror. This is due to the fact that the intelligence and character of the masses are incomparably lower than the intelligence and character of the few who produce something valuable for the community.

— ALBERT EINSTEIN

That is where evolution has landed us today.

On the other hand, there may be more to man than this dark animal strain. His unpredictable nature may include, not alone the animal from which he comes, but the God toward which he goes. In that case it may be that the lessons of psychiatry will be learned by the mass of mankind and his intelligence and character be raised to a point where he will abandon his ancient goals and follow higher ones. Better goals have been offered by enlightened minds but we have not yet accepted them. Will we?

The answer lies in those frontal lobes. They are our hope as well as our danger. What might we not become if we should learn to use those vast areas of the brain that now lie idle? Even the greatest geniuses have probably not employed the full capacities of their frontal lobes — not Aristotle, nor da Vinci, nor Newton, nor Darwin. The brain cells are there, millions of them, lying fallow. That non-dominant hemisphere offers immense opportunities. Certainly we have not yet employed the brain to anything like its full capacity. Certainly it holds possibilities of tremendous new achievements.

But these unused cells cannot, it would appear, educate themselves. If that nondominant hemisphere could have acquired knowledge and skill of itself, it seems that it would have, for it is in all respects similar to the one we have chosen to educate. In the process of educating ourselves we activate dormant cells. In the answer to the question of whether or not we shall be able to educate these uneducated portions of our brains lies our destiny.

Here we come up against one of the oldest arguments in the world, free will versus predestination.

There are those who say, "Man cannot change his biological nature by willing. Whatever an individual may accomplish by sheer force of will cannot be transmitted to his offspring. Man endures a lifelong struggle between the ideals dictated by his painfully acquired culture and the passions dictated by his biology. He is by heredity the product of his phylogenetic forebears but not of the culture of his parents." In which case the

human race cannot, by any effort of will, educate those dormant portions of the brain.

But others think differently. They hold that it is only through exercise of the will that we have come so far along the road of evolution, and that the race, certainly the individual, advances because of the possibility of exercising this power.

It was the contention of so sound a neurologist as Tilney that men are not born great. The special abilities which make men great, he asserted, are all acquired by the driving force of their will. The brain of a man of genius, he pointed out, was smooth and round in childhood and grew to the infinitely complicated mechanism it was in his old age because of the thought with which he plowed it. He *willed* to educate it. Greater aptitude for learning than you or I he may have had, but it was his relentless will that, in the last analysis, worked it into those intricate convolutions wherein his talent lay. It is, Tilney concluded, the man who makes the brain, not the brain which makes the man. It is the unconquerable human will which fashions the animal brain with which he is endowed at birth into a human brain. No outside stimuli have the power which the human will alone possesses to plow into the brain those furrows which make it human. It is the will alone which slowly builds a speech center and, following that, all the other powers man possesses.

Not all authorities will go so far with him, but most will go a long way in the importance they assign to the will. And beyond the will lies another faculty without which the will would not budge. Interest. It is interest which lures a man to greatness, enticing him to exert his will and put forth energy. It is interest which keeps him great into his old age, as we clearly see in the case of such towering figures as Churchill, Franklin Roosevelt, Chiang Kai-shek, Clemenceau, Foch, Anatole France, Rodin, Edison, Gladstone, Goethe, von Humboldt, Victor Hugo, Kant, Rembrandt, Titian, Michelangelo — all that glorious company of grand old men who, in old age as in youth, were mercilessly goaded by curiosity, insatiable for

knowledge, greedy for life, unquenchable in vitality, indomitable in will.

Whether by will or by accident or by some evolutionary principle, it is indubitable that Man has come a long way from his lowly beginnings. There is still a long way ahead for him. Whether or not we are to travel that road, guided by the light psychiatry is throwing upon human nature, depends upon whether or not we can abandon the old goals of possession and aggression and choose better ones.

Can a race which is capable of committing the horrors perpetrated in this war (but also of the deeds full of beauty and goodness everywhere being done) survive? Or must it be scrapped and another experiment in humanity begun?

That is the question we now face. If we perish, we would not be the first race to appear on earth, struggle for life, and finally meet extinction. Now we must ask ourselves: Are we good enough to survive — or must we, too, pass?

That is the question — and no other is comparable with it — which is even now being decided. So far we have failed. Will we be given another chance? We don't know. We can only believe that — God is a gentleman.



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